

AIR POLLUTION—1970

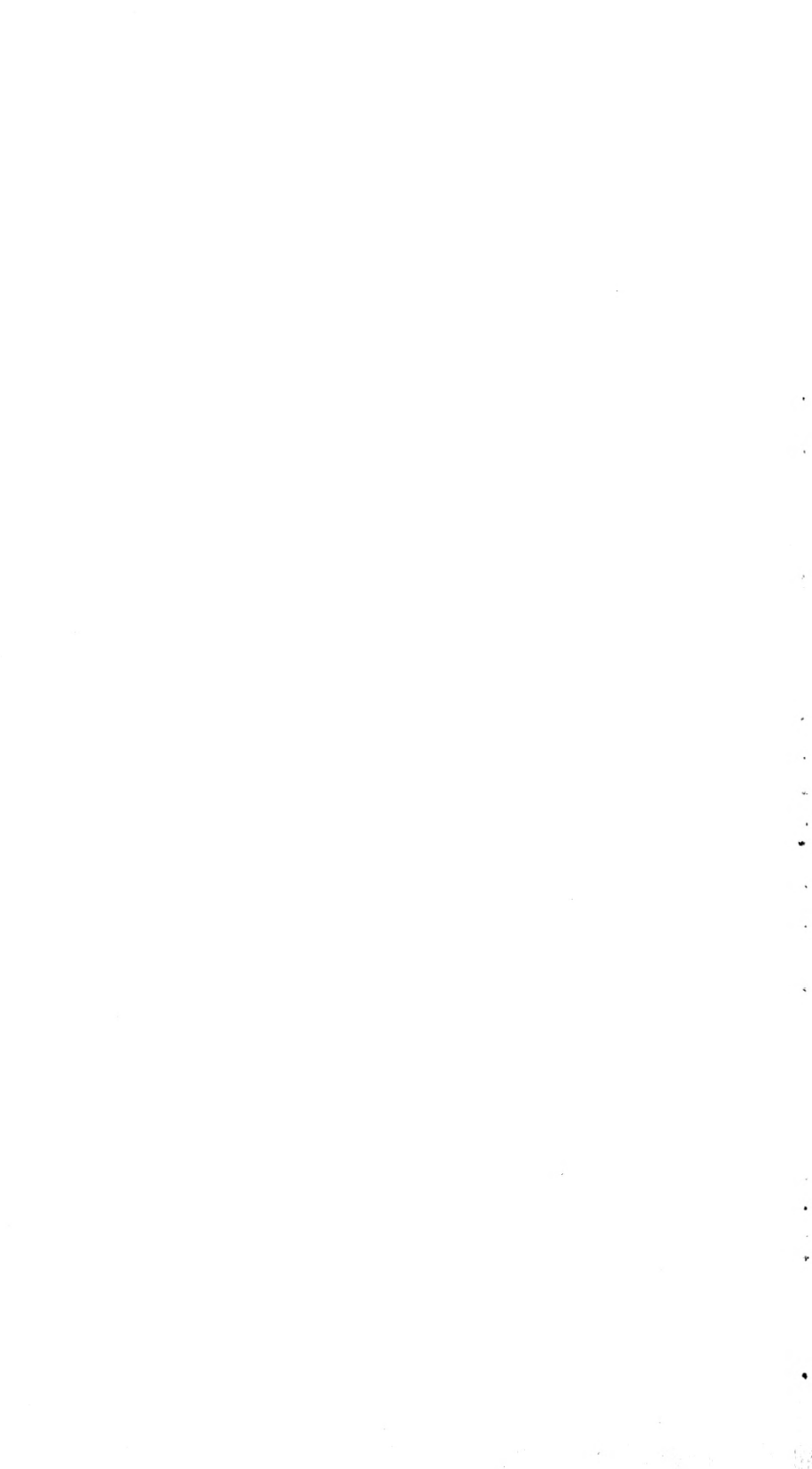
Part 2

HEARINGS
BEFORE THE
SUBCOMMITTEE ON
AIR AND WATER POLLUTION
OF THE
COMMITTEE ON PUBLIC WORKS
UNITED STATES SENATE
NINETY-FIRST CONGRESS
SECOND SESSION
ON
S. 3229, S. 3466, S. 3546

MARCH 19, 20, AND 23, 1970

Printed for the use of the Committee on Public Works





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CONTENTS

WITNESSES AND STATEMENTS

THURSDAY, March 19, 1970

	Page
Boggs, Hon. J. Caleb: Opening remarks.....	447
Germano, Joseph, director, District 31, United Steelworkers of America, accompanied by John J. Sheehan, legislative director.....	464
Jaskulski, Mrs. Robert H., chairman, Southeastern Wisconsin Coalition for Clean Air (submitted statement).....	472
Sargent, Hon. Francis, Governor, State of Massachusetts.....	448
Teller, Dr. Aaron J., on behalf of Teller Environmental Systems, Inc.....	454
Richy, Herbert S., chairman, Natural Resources Committee, Chamber of Commerce of the United States, accompanied by John J. Coffey, senior associate for natural resources and environmental quality.....	473

FRIDAY, MARCH 20, 1970

Bixby, Dr. Willard F., vice chairman, Air Quality Committee, Manu- facturing Chemists Association, accompanied by Dr. Kenneth D. Johnson, staff engineer.....	584
Blake James M., M.D., member, Council on Legislation, American Medical Association; accompanied by Harry N. Peterson, attorney, Depart- ment of Legislation, American Medical Association.....	573
Glogau, Richard C., senior vice president, Engelhard Minerals & Chemicals Corp., and executive vice president, Engelhard Industries Division....	577
Lenher, Samuel, executive vice president and director, E. I. Du Pont De Nemours & Co.; accompanied by Dr. Donald R. Diggs, technical director, Petroleum Chemical Division; and Dr. G. J. Stopps, assistant director, Haskell Laboratory of Toxicology.....	500

MONDAY, MARCH 23, 1970

Cohen, Bernard S., vice chairman for Federal Legislation, the American Trial Lawyers Association.....	823
Jeans, Prof. James W., University of Missouri, Kansas City, Mo.....	828
Mikva, Hon. Abner J., a Representative from the Second Congressional District of Illinois.....	619
Moorman, James, Esq., Washington, D.C.....	621
Preiser, Stanley, Esq., Charleston, W. Va.....	816
Rogers, Edward Lee, general counsel, Environmental Defense Fund, Inc.....	846
Sive, David, Esq., New York, N.Y.....	840

ADDITIONAL DATA

Bixby, Dr. Willard F.: Photoreactivity of trichloroethylene: Summary report, by Katherine W. Wilson.....	593
Cohen, Bernard S.: Massachusetts Legislature, 1970 Tentative Committee Report— S. 907.....	838

	Page
Edison Electric Institute, submitted statement.....	495
Lenher, Samuel:	
Biography of Samuel Lenher.....	500
Dupont Exhaust Manifold Reactor.....	515
Exhaust manifold thermal reactors—a solution to the Automotive Emissions Problem, by J. J. Mikita and E. N. Cantwell.....	521
Symposium on Air Quality Criteria—Lead, by Gordon J. Stopps, M.D. Lead research: Current medical developments, by Gordon J. Stopps, Mary E. Maxfield, Martha McLaughlin, and Sidney Pell.....	539
Manufacturing Chemists Association: Letter dated June 12, 1970 from William J. Driver, president, with suggested language for S. 3546.....	551
McClanahan, W. W., Jr., executive vice president: Statement on behalf of the National Coal Policy Conference.....	859
Moorman, James, Esq.:	
Brief No. 23,812, in the U.S. Court of Appeals for the District of Co- lumbia Circuit.....	448
Brief No. 23,813, in the U.S. Court of Appeals for the District of Columbia Circuit.....	625
Muskie, Hon. Edmund S.:	
Letter dated February 16, 1970, from John T. Middleton, Commissioner, Environmental Health Service re telegram protesting alleged industry domination of public hearings.....	691
Letter dated December 17, 1969, from W. B. LeMaster, et al., protesting in behalf of United Auto Workers Union, Cincinnati area, industry domination of air quality control hearings.....	496
Letter dated December 19, 1969, to Dr. Middleton from Dr. E. W. Arnold, director, Ohio Department of Health denying charges.....	496
Richey, Herbert S.:	
Natural Resources Committee of the Chamber of Commerce of the United States of America.....	497
Rogers, Edward Lee:	
<i>Boomer v. Atlantic Cement Co.</i> : State of New York Court of Appeals..	480
Weits, Karel A., president: Statement on behalf of the Industrial Gas Cleaning Institute, Inc.....	853
	492

AIR POLLUTION—1970

THURSDAY, MARCH 19, 1970

U.S. SENATE,
SUBCOMMITTEE ON AIR AND WATER POLLUTION
OF THE COMMITTEE ON PUBLIC WORKS,
Washington, D.C.

The subcommittee met at 9:30 a.m., pursuant to recess, in room 4200, New Senate Office Building, Hon. Thomas F. Eagleton (member of the subcommittee) presiding, pro tempore.

Present: Senators Randolph, Muskie, Eagleton, Boggs, and Dole.

Also present: Richard B. Royce, chief clerk and staff director; Bailey Guard, assistant chief clerk, minority; Thomas C. Jorling, minority counsel; Leon G. Billings, Richard D. Grundy, and Adrien Waller, professional staff members.

Senator EAGLETON (presiding). Good morning, ladies and gentlemen. The Subcommittee on Air and Water Pollution of the Senate Committee on Public Works is now in session to continue its public hearings on S. 3546, S. 3466, and S. 3229.

At this time I will yield to Senator Boggs.

OPENING REMARKS OF SENATOR BOGGS

Senator Boggs. Thank you, Mr. Chairman.

Mr. Chairman, it is a great honor this morning to welcome Governor Sargent of Massachusetts who I know will present the committee with valuable testimony on the subject of air pollution and the related problems.

I was just talking to our distinguished colleague from the State of Massachusetts, Senator Brooke. It is just impossible for him to be here at this moment due to previous commitments. He asked me to say to the committee and to Governor Sargent how happy he is that the Governor is here testifying before the committee.

He wishes he could be present and personally present the Governor to the committee. In lieu of that, he asked me to give the Governor his highest regards. He will see him later. He thanks the committee for hearing Governor Sargent.

May I also add, Mr. Chairman, one of the major causes of air pollution is, of course, the automobile; and tomorrow morning, the subcommittee will hear from Dr. Samuel Leonard, vice president of the Du Pont Co., which is headquartered in my State of Delaware.

I only mention this because Dr. Leonard intends to bring with him an experimental pollution-free vehicle that Du Pont says is capable of operating with little or no emission on present-day gasoline.

The car will be parked on C Street near First Street, just outside the New Senate Office Building tomorrow morning, and into the early afternoon.

I hope that some of my colleagues will have a chance, as well as the public, to see the car and discuss its methods of operation with the technicians who will be accompanying it.

Dr. Leonard, as you know, was a member of the task force on environmental health and related problems that existed between November 1966 and June 1967 under the Department of Health, Education, and Welfare.

Again, Mr. Chairman, we are honored and grateful to Governor Sargent, the distinguished Governor of the great State of Massachusetts, for being with us today.

We look forward to your testimony, Governor.

Senator EAGLETON. Thank you, Senator Boggs.

I, too, wish to add a personal word of welcome to our distinguished witness, the Governor of Massachusetts.

He and I previously held important positions in public office. We were both Lieutenant Governors of our respective State and Commonwealth. Since then, we have both gone downhill.

Senator Boggs. I wouldn't agree with that, Mr. Chairman. I think you both are doing great. I will tell you that. We are proud of both of you.

Senator EAGLETON. Thank you, sir. We welcome the Honorable Francis Sargent, the Governor of the Commonwealth of Massachusetts.

STATEMENT OF HON. FRANCIS SARGENT, GOVERNOR, STATE OF MASSACHUSETTS

Governor SARGENT. Thank you very much, Mr. Chairman.

Senator Boggs, thank you for your very thoughtful statement.

I might say, Mr. Chairman, I now have no Lieutenant Governor. There is no provision in my State for having a Lieutenant Governor until the next election.

Senator EAGLETON. That is a blessing, isn't it, really?

Governor SARGENT. It is a mixed blessing. I don't have anyone checking every morning as to how I am feeling, as I used to do when I was Lieutenant Governor myself—and no one to cut the ribbons either.

I am very pleased and honored to have the opportunity of appearing before your committee. I apologize for the fact that although scheduled for appearance yesterday, I wasn't able to be here. I had some sort of a bug. I think the polite word for it is intestinal flu.

I appreciate very much the fact that you have been able to schedule me this morning.

I am speaking not only as the Governor of Massachusetts, but I am also speaking for the National Governors' Conference. I am a member of the subcommittee that deals with natural resources, a subcommittee of the National Governors' Conference.

When the Clean Air Act was enacted in 1967, there were many who declared that it represented an infringement by the Federal Government on the rights of the States.

Mr. Chairman, I believe in the new federalism, as much as anyone in this room.

But I also believe, Mr. Chairman, that 20 years from now it will be little consolation to someone with contaminated lungs that men fought and argued today about which level of government could best do the job of cleaning our air.

The fact is, Mr. Chairman, that many State health officials who had opposed the Clean Air Act of 1967 as an encroachment on their duties, would now like to see even greater Federal involvement in air pollution control. And these are the individuals who have had to live with the Clean Air Act and who have had to administer it.

In the Commonwealth of Massachusetts, and nationally, we have made considerable strides in air pollution control since the enactment of the Clean Air Act. But if we look at the overall national picture, the problem is growing faster than our efforts to control it are moving forward. We are actually slipping behind, in my opinion.

It is apparent that the Clean Air Act is not enough in the crisis in which we find ourselves.

It is for this reason that I enthusiastically endorse Senate bill 3466 in concept, which would amend and strengthen the Clean Air Act of 1967.

The most important aspect of this legislation is that it will speed the job of getting our air clean.

And, Mr. Chairman, we simply can't wait.

But this bill will do much more.

Uniform national air quality standards, as proposed by this bill, with some opportunity for modification, will not only cut the paperwork and red tape and speed the adoption of implementation plans by the States, they will also cut the cost of pollution control.

Industry will know what is required of it and will not have to face tailor-made specifications for each State.

Industries which are located within an air quality control region will no longer be penalized when competing with firms situated outside such a region.

And since States will be permitted to adopt more stringent standards, no State will be able to claim that Federal intervention has prevented it from obtaining a higher air quality.

Actually, for Massachusetts, this question is academic. We have already gone far beyond what is required of us—or even what will be required of us—under the Clean Air Act.

Last year, I submitted legislation, which was enacted, authorizing our State department of public health to establish air pollution control districts throughout the Commonwealth and to alter or expand existing districts. That legislation is now being implemented.

The State has been divided into six air pollution control districts. This means that every square inch of Massachusetts is included in a regional air pollution control program.

Here again, action must come from the Federal level. Any other course would result in chaos in industry, confusion among the public, and spiralling costs for Government and citizen alike.

The market for fuel is national. The regulation of that market must be national. It is unreasonable to expect oil companies to supply fuel of different composition in each of 50 States. That would not be the orderly process of Government. That would be a nightmare.

The second provision of S. 3466 which I would like to endorse at this time is that providing for the establishment of national emissions standards for facilities which emit pollutants.

I would like to point out that that relates only to new facilities, and I think there should be consideration given to standards for existing facilities.

This will simplify the job of the States. It will lower the cost to industry—and, therefore to the consumer—of pollution control.

It will encourage additional research in the technology of control of air pollutants, since the fruits of that research will be able to be applied efficiently, uniformly, and on a nationwide scale.

But here again, on principle must be clear: in no case must Federal standards be used to weaken our efforts to control pollution. Federal standards are acceptable—if they are strict, if they are firm, if they show no favoritism for any industry, no matter how powerful or influential.

Finally, I applaud the provision in S. 3466 which would provide increased Federal authority to seek court action against polluters, even in intrastate situations. No State that is doing a good job in fighting air pollution has anything to fear from this proposal. My State does not fear it. And any State that is not doing the job it should be, deserves to have this provision of law to contend with.

The control of air pollution concerns the preservation of life and health. A strong Federal role in this area is an established fact. The precedent was established generations ago—food and drug regulation, meat inspection, mine safety—we accept Federal involvement in all of these areas as a necessity. The cleanliness of our air concerns us no less.

Truthfully, Mr. Chairman, I haven't had an opportunity to review carefully the other bill before your committee, Senator Muskie's bill, S. 3546.

One of the features of it, however, that we have noted, is that there is a call for added citizen participation.

In my view, this would be desirable, and I think it would be a desirable provision to be added to the administration proposal, if that was the view of the subcommittee.

The effect of this is virtually the same as if the entire State had been included in a Federal air quality control region, which is not the case. In fact, one of the new air pollution control districts we have established even anticipates the designation of a Federal air quality control region.

Nevertheless, we feel that S. 3466 is a forward step, because of what it will do nationally to make up for lost time in the crucial effort for clean air.

I am particularly glad to see that this legislation provides for tougher Federal action against pollution from the automobile.

We know that half—and probably much more than half—of all air pollution comes from motor vehicles. The public is clamoring for action. If 50 State Governors respond in 50 different ways—and we are not entirely preempted by the 1967 act—that would be a disaster.

The Federal Government must act—swiftly, firmly, and responsibly. No action taken at the Federal level will have more significance than this one in the battle to save our environment—to save ourselves

from ourselves. If we are going to stop poisoning our planet, we have got to start with automobiles.

Existing procedures for testing of new motor vehicles by the Federal Government for compliance with emission standards are inadequate. The legislation before you will correct these inadequacies.

But decisive Executive action is also required at the Federal level.

The Department of Health, Education, and Welfare has issued air quality criteria for sulfur oxides and for particulates. But pollution from automobiles involves primarily lead, carbon monoxide, and oxides of nitrogen.

My State is ready to move forward in setting standards for these pollutants and adopting programs to control them, but the 1967 Clean Air Act required us to wait for the issuance of the Federal criteria.

While we have no authority to impose requirements on new automobiles, this Federal preemption does not apply to older vehicles.

We are ready to act, but we are being held back. I hope the subcommittee will address itself to the problem of speeding this procedure at the Federal level, so that Federal air quality criteria will be established more quickly in the future.

In closing, I wish to express my support for three other provisions included in S. 3466.

The first concerns the establishment of Federal standards for fuels and fuel additives. As public officials, we can only ask ourselves in astonishment, "Why did we not do this 10 years ago? Can it be that we did not know then what we know today?"

Senator EAGLETON. Thank you very much, Governor, for your very fine statement, and also for the addendum that you tacked on at the end with respect to the other bill.

I am not going to question you about detailed specifics of the bill, but I will discuss with you just some broad public policy questions, one of which you already brought up on your own.

To emphasize it for the record, I take it that it is the thrust of your testimony that at all levels of this pollution control process you would favor the maximum amount of public participation so that the public can express its views, its concerns, its ideas to those who will be in the decisionmaking process with respect to air pollution.

Is that a fair summary of your attitude?

Governor SARGENT. This is my view, Mr. Chairman. I think we do have to have a series of Federal standards that apply in all the States as a minimum.

I think if each State goes its own way in something that is as elusive as the air overhead, I think this would be absurd.

But I think there must be an opportunity for citizen participation, and I think there should be an opportunity for some flexibility. But at least have a minimum standard that must be required in every single State.

Senator EAGLETON. I also take it that it is part of your prepared statement that you feel a great sense of urgency about this problem, that it is a nonpostponable one. It is very heavily and immediately with us and the time to move on it is now, not a year from now, 2 years from now, or a decade from now; but now.

Is that a fair capsulization of your opinion?

Governor SARGENT. I certainly do feel that way, Mr. Chairman. I have been involved in the field of conservation for a great many years in one post or another at both the State and Federal level.

At that time it always used to be called conservation. I think it has a new dynamic concern now that it is called environment, now that people understand that this is a problem that affects everyone, that industry can't escape the responsibility, that it has to play a part.

In my view, no more time can be permitted to go by. We have to move forward, and I think we have to move forward across the entire Nation.

Senator EAGLETON. Allow me to follow up on that thread. Without trying to commit you to specific sections of specific bills, but keeping my questioning in the realm of policy, if this committee felt on its examination of the various proposals before us that a certain section of any bill or a certain procedure would, because of things implicit in the suggestion, countenance any further delay in strict enforcement of air pollution standards, would you favor that we strike from the bill, or any bill, any delay mechanism so that we could hopefully trigger more speedy and immediate enforcement?

Governor SARGENT. I would certainly stress the need for action, the need for action now. Of course, it has to be considered action. We all, I am sure, recognize that. But I think the time has gone by when we can any longer delay and we can any longer argue as to whether the Federal Government should run the show or whether the States should. I think there has to be a partnership as we have never had it before.

But I think there absolutely have to be Federal standards.

Senator EAGLETON. I am intimately cognizant of the detailed operation of air pollution control only in my own State, Governor, the State of Missouri. As is true, though, I think, with all States, we have in mind a serious budgetary crisis.

In fact, we have an income tax referendum election in Missouri the first Tuesday in April. While that referendum is pending, and I can't predict the outcome, the Governor has been forced to cut back on the existing budget.

One of the areas, unhappily from my point of view, and from his point of view, in which he was forced to cut, was in air pollution control, in terms of personnel, and so forth.

I would like to pose this question to you as a Governor of a State, and as you are here before us as the spokesman for the Governors' Conference: How well are the States geared up in terms of personnel, manpower, enforcement, and of monetary availability to meaningfully and substantially enforce regulations, whether they be national or regional?

Governor SARGENT. I can't speak, of course, for any individual State. But I am sure that the records would indicate that all of the States are backward.

Senator EAGLETON. All of them are backward?

Governor SARGENT. Yes. I think that all of them will have to have additional personnel and additional funding. I know in my State this year I recommend doubling the budget for air pollution control, with particular reference to enforcement.

I think it will be found that most of the States probably will need to beef up their operations.

Senator EAGLETON. The 1967 Clean Air Act provides at the beginning level, that the Federal Government assume two-thirds and the State governments assume one-third the cost of enforcement, personnel, and other expenses. At a later level, this would work down to a 50-50 relationship. This type of assistance would be continued under the Muskie bill and under the administration bill, S. 3466.

I take it you would recommend continuing that kind of Federal financial assistance in this endeavor?

Governor SARGENT. Yes; I would. But I felt that I would, in a sense, bite the bullet in Massachusetts this year, and I recommended the doubling of our budget, really not knowing how much Federal assistance would be available.

But I think that, of course, there must be Federal assistance. There must be substantial Federal assistance. But I think the States can't just shrug their shoulders and say, "Well, let the Federal Government do it."

I think there has to be partnership, but I think the States have to move aggressively in this area, also.

Senator EAGLETON. Governor, could you get for us, through the National Governors Conference, this kind of 50-State analysis: (a), The current funding levels in the 50 States on air pollution, which may be intermingled in some States with water. In my State it is separate. It may vary from State to State. That is what, under the existing budgets of the 50 States, they are spending on a statewide basis for air pollution control.

Part (b), how much the Governors feel would be necessary to spend to do a first-class, effective job, what they have to spend now, what they would like to be able to spend if they were to do a top rate job.

I know that may take some time to assemble, but do you think the staff of the Governor's Conference can help us on that?

Governor SARGENT. I will ask the staff of the National Governors Conference to gather this material right away. I think it is important information for your committee, Mr. Chairman.

I would like to point out that the questions that you have been posing really are, in a sense, 50 questions, because I think each one of the 50 States is handling it differently. I think some of the States probably are doing a remarkably good job with perhaps surprisingly large funds to work with.

Other States, I am sure, are doing next to nothing with very, very few personnel assigned to this work. So I think this information will be very useful and very useful to the administration as well as to your committee.

Senator EAGLETON. We would love to have it. I know it may be difficult to assemble, but these hearings will continue for several weeks. If we could have that information, it would be appreciated.

Governor SARGENT. Mr. Chairman, I have sitting with me a member of the staff of the National Governors Conference, and I have asked him to gather this data as quickly as he can and submit it directly to the committee.

Senator EAGLETON. I have been told that a Harvard Law School group has proposed citizen suits for environmental uses in your Commonwealth of Massachusetts.

In the Muskie bill—S. 3546—there is authorization for such citizen suits to enforce air quality standards.

Do you support such a concept?

Governor SARGENT. Yes; I do. As a matter of fact, in my message to the legislature this year, I proposed a bill of rights which would give to the citizens of our State the right to clean air, the right to waters that are no contaminated, and the opportunity to take legal action if legal action is called for.

So I would support the concept.

Senator EAGLETON. Governor, just to wrap this up, we had a very interesting witness yesterday, Professor Linsky, from the University of West Virginia. In his prepared statement he cited this rather interesting quote which I think might be of interest to you:

I recently ran into a statement attributed to the first public utterance of the first State Board of Health in the United States, that of Massachusetts, in 1869.

Here is what the State Board of Health of Massachusetts said 100 years ago:

We believe that all citizens have an inherent right to the enjoyment of pure and uncontaminated air and water and soil; that this right should be regarded as belonging to the whole community, and that no one should be allowed to trespass upon it by his carelessness or his avarice or even by his ignorance.

I think that is a very fine and commendable statement. It even reads better since it is 100 years old.

I take it you subscribe to that statement.

Governor SARGENT. I wish I could claim it myself, Mr. Chairman. It was very well stated. When was it?

Senator EAGLETON. 1869. We will send you a copy of it.

Governor SARGENT. Thank you very much.

Senator EAGLETON. You might use it in one of your Fourth of July speeches.

Governor SARGENT. Thank you.

Senator EAGLETON. Thank you, Governor. We appreciate your appearance very much.

Our next witness is Dr. Aaron Teller of the Teller Environmental Systems, Inc.

STATEMENT OF DR. AARON J. TELLER ON BEHALF OF TELLER ENVIRONMENTAL SYSTEMS, INC.

Senator EAGLETON. We welcome you, Dr. Teller. You may begin. Your prepared statement will be included in the record and you may proceed as you wish.

Mr. TELLER. Thank you, sir.

(The prepared statement follows:)

PREPARED STATEMENT OF DR. AARON J. TELLER

Gentlemen, I should like to offer my congratulations to the distinguished Senator from Maine for the vigor and determination for recovery of our environment as indicated in the Bills S. 3229 and amendments thereto S. 3466 and S. 3546.

The significant advance in concept is that of emission standards coupled with ambient air objectives. Here industry has precise requirements providing them with a degree of confidence related to quantitative rather than qualitative requirements.

There is, however, some danger in the language of Bill S. 3546. There are repeated statements regarding "recommended control techniques" [Note Sec. 4, par. 1, lines 2 and 3, and Sec. 4, par. 1B, lines 2 and 3, Sec. 4, par. 2A, line 9] Three concerns develop:

1. If the government recommends, it is tacitly assuming some of the responsibility for abatement.

2. With industry "under the gun," it may, without concern for optimization, accept "recommended control techniques" even though these existing techniques may not be best for that industry.

3. The establishment of "recommended control techniques" can, by the inescapable imposition of bureaucracy, inhibit innovation.

The inhibition of innovation is the most dangerous consequence of this language. Air pollution control requires a new and unique technology. Most of the types of equipment available today were designed for purification of streams containing product materials where the cost of purification was insignificant compared with the value of the product. Not so with air pollution control.

We can accept an energy efficiency of 10% where the concentration of the product is 50% because we waste the energy on only one-half the stream. In air pollution, the concentration of the "product" may be in the range of 100 PPM. If we were to accept the same inefficiencies of separation, we would be wasting energy on 99.99% of the stream. This is an unwarranted waste of society's resources and we cannot apply today's process-oriented equipment to the solution of environmental control.

Let me give you examples. Florida regulations established that there be an air flow of 1000 CFM per foot of the long side of a fertilizer storage building. This meant that we had to treat 200,000 CFM per average building. We developed an air flow regime that would provide greater safety to the workers and the community, that requires only 60,000 CFM for treatment. The result was a 60% reduction in capital cost, 67% reduction in utilities, and a 67% reduction in pollution to the community—only because we did not use "recommended equipment."

In another case in Canada, the problem was removal of submicron particulates. The "recommended equipment" was reflective of the existing "state of the art." These systems reflected a capital investment of \$1,200,000 and an annual utility cost of \$100,000.

A new concept, "nucleation," was applied and we were able to achieve our goals with a capital investment of \$200,000 and an annual utility cost of \$30,000.

From a technological viewpoint, the solutions will come from innovative fundamentalism applied to the new boundaries of treating large volumes of gas with low concentrations of material. We must, in no way, inhibit innovation. It is, therefore, suggested that the statement "recommended control techniques" be replaced with "in conformity with the achievements of the state of the art." This statement would not only permit but encourage innovation.

In addition it would provide flexibility in emission standards—such that they could respond to improvements in technology. For example, the Florida law on fluoride emissions established a level of 0.4 lb fluoride per ton of P_2O_5 but that the emission level correspond to the increasing achievements of technology. As a result, we have not installed a fertilizer complex since 1966 that, by design, exceeded 0.2 lb F per ton of P_2O_5 .

It is technological innovation coupled with effective legislation that we must depend on for the future.

It is further suggested that the Senate consider an incentive for looping the system, the return of the pollutant to the process or concentration of the pollutant for use in other processes. Too often the abatement of air pollution leads to creation of water pollution or the accumulation of solid wastes. Mere compliance or submission to regulation via "black box" processes leads to this undesirable effect.

We can never completely abate pollution unless the natural resources are used completely and reused and reused. For if this is not achieved, there must be a discharge. We must create a closed system society if we, the human race, are to survive. This approach need not inhibit progress or inhibit continuing increase in goods and services. It merely establishes a recycle system. Unless and until we achieve this objective, we shall continue to see more and more hearings, more and more legislation to plug the holes, and more and more realistic concern for the future of our Nation and Man.

Mr. TELLER. I am most impressed with the bills, especially that of S. 3546, Senator Muskie's bill.

The significant advance in concept is that emission standards are coupled with ambient air objectives. I suppose I speak with a forked tongue as a former academician and now as a member of industry designing these systems.

The ambient air standard, although this is a major concern for the protection of the public, is inadequate in establishing what emission standards shall be because of variable atmospheric conditions.

As a result, ambient air objectives are valid only when there is one emitter in a community. Otherwise, we can't tell who is perpetrating the crime.

For the first time now, industry would have precise requirements providing them with a degree of confidence related to quantitative rather than qualitative requirements.

There is, however, some danger in the language of bill S. 3546, at least from a technological standpoint, and certainly from an economic standpoint.

There are repeated statements regarding "recommended control techniques" (note sec. 4, par. 1, lines q2 and 3; and sec. 4, para. 1B, lines 2 and 3; sec. 4, para. 2A, line 9).

Three concerns develop:

1. If the Government recommends, it is tacitly assuming some of the responsibility for abatement. I don't think the Federal Government should be required to establish performance or accept responsibility.

2. With industry under the gun, it may, without concern for optimization, accept recommended control techniques even though these existing techniques may not be best for that industry.

3. The establishment of recommended control techniques can, by the inescapable imposition of bureaucracy, inhibit innovation.

The inhibition of innovation is the most dangerous consequence of this language. Air pollution control requires a new and unique technology.

Most of the types of equipment available today were designed for purification of streams containing product materials where the cost of purification was insignificant compared with the value of the product. Not so with air pollution control.

The purification procedure in product manufacture can be very uneconomic because of the high value of the product.

On the other hand, in the case of air conditions, we are dealing with streams that may be as low as 100 parts per million and as low as five parts per million.

Under those conditions, one cannot beat the stream to death economically. If we do, then we have an unwarranted waste of society's resources to restrain pollution, and pollution is a waste of society's resources.

Let me give you some examples, if I may. I have been involved with about 80 percent of all installations for the fertilizer industry and we have reduced emissions of that industry over 80 percent in the last 8 years while doubling production. The Florida regulations, that is, recommended control technology 3 years ago, established that there be an airflow for a storage building of approximately 200,000 cubic feet a minute.

This was recommended to the industry and installed in many locations. Two years ago, we decided that this was unwarranted because there is a minimum amount of air pollution or pollutants in a stream. Therefore, the larger the stream the more of this minimum amount of pollutant being vented to the public, and we would like to reduce this from an economic viewpoint, from a safety viewpoint.

Under those conditions, even though the State's recommended control technology called for 200,000 cubic feet a minute, we were able to reduce it by variation in design to 60,000 cubic feet a minute.

The result was a 60-percent reduction in capital cost, a two-thirds reduction in consumption of utilities, and a two-thirds reduction in the residual pollution to the community only because we did not use recommended equipment.

In another case in Canada, the problem was removal of submicron particulates. Again, here we had recommended equipment reflective of the existing state of the art. These systems reflected a capital cost of \$1.2 million, and an annual utility cost—consumption of electricity requiring the combustion of fuels which result in silver dioxide emissions—of \$100,000.

By applying a new concept, nucleation, we were able to achieve the same goals; in fact, improve on the emission levels, with a capital investment of \$200,000 and an annual utility cost of \$30,000.

The application of existing technology is inadequate in air pollution. We proved this in the fertilizer industry in 1960. We are in process now of proving this on jet engine test cells where we will improve the recovery over that of recommended techniques and reduce the capital investment by 70 percent.

We have to create a new technology for coal mines because of the new laws, and these are now in process.

Under these conditions, the solutions to air pollution will not come from recommended techniques that exist today, but from innovative design.

We will have to apply it to the new problem of treating large volumes of gas with low concentrations of material, a technology that has not yet come to fruition. We must in no way inhibit innovation.

It is, therefore, suggested that the statement "recommended control techniques" be replaced with a statement such as "in conformity with the achievements of the state of the art."

This statement would not only permit, but encourage innovation. Until we achieve these innovations we will not solve our air pollution problem.

I made the statement yesterday at the fourth annual conference of regional councils, where I indicated we must create in the new technology, and until we do so, no legal force or restraint will compel the emitters to control.

When technology supplies the people with these systems, then legal restraint or force will be only incidental.

In addition to this, in conformity with achievements of the state of the art would provide flexibility in emission standards. This is critical.

The emission standards should respond to improvements in technology. They should not be permanent. For example, the Florida law on fluoride emissions established in 1963 when we put in our first

system to a level of four-tenths of a pound of fluoride per ton of phosphate, but it established that the emission level correspond to increasing achievements of technology.

As a result, since 1966, we have not installed a fertilizer complex that by design exceeded two-tenths of a pound per ton of P_2O_5 .

In reality, we have achieved emission levels in that State of 0.15 pounds of fluoride per ton of P_2O_5 . Flexibility, response to improvements in technology, have reduced the legal level by more than 50 percent, and this only in about 7 years.

It is technical innovation coupled with effective legislation, and we need that effective legislation, that we must depend on for the future.

It is further suggested that the Senate consider an incentive for "looping the system," the return of the pollutant to the process or the concentration of the pollutant for use in other processes.

Too often the abatement of air pollution in response to legislation leads to creation of water pollution or the accumulation of solids waste. Mere compliance or submission to regulation by the black box leads to this undesirable effect.

We can never completely abate pollution unless the natural resources of this Nation are used completely and reused and reused.

If this is not achieved there must be a discharge, and discharge is pollution. We must create a closed system society if we are to survive. This approach need not inhibit progress, as many of our conservationists are proposing, or inhibit any increase in goods and services.

It merely establishes a recycle, a reuse system, and the recycle can be as rapid as we want to make. Thus, the service of technology to society can continue to increase but not at the expense of natural resources.

The preservation of the resources are inexorably intertwined with the control of pollution, and unless and until we achieve this objective, we shall continue to see more and more hearings, more and more legislation to plug the holes, and more and more realistic concern for the future of man.

Senator MUSKIE (now presiding). Thank you, Dr. Teller.

I would like to take a moment to welcome the children who are here this morning. I know they are here because they are interested in the pollution problem. One of the reassuring things I note around the country is the extent to which the schools are teaching the story of pollution to young children.

I remember a school I visited in Maine a couple of weeks ago when a little boy said, "Are you going to clean up pollution?"

I thought I would test him to see how deep his concern was. I said, "Do you think we need to clean up pollution? If so, why?"

He said, "I think we should because it smells like rotten cabbage."

That is the direct approach to pollution.

I am afraid that as you attend hearings on this subject, you will find them technical, dry, and probably even dull. It may not be as dramatic this morning as you might wish it were, or as colorful.

The testimony we are hearing is very important and has very much to do with the question of whether or not we control pollution.

I wanted just to take a moment to express my pleasure that you are here and apologize for the dullness of much of the testimony that we

hear. We express the hope that you won't think that this is a reflection on the importance of the problem.

Dr. Teller, I know that you are in the position, because of your background and experience, to give us very useful advice in this whole field. You have touched on a point that I think is very important. I must say that your approach to it is really what we had in mind, when we used the language "recommended control techniques."

As you interpret the language which we used, I would agree with you that it would tend to freeze in technology, even outmoded technology.

We ought to try to stimulate innovation and the expansion with our policy and legislative language of technological horizons.

I rechecked the language of the Act and I find that the word "recommended" is in there. What we intended, really, in the 1967 Act, was a requirement that at the same time the Department issued criteria to indicate the health and welfare effects of pollutants, that it would provide sufficient information to indicate ways of controlling these pollutants.

It was not our intent that the criteria be frozen to particular kinds of techniques.

There is always the question of whether or not there is a way of dealing with a particular pollution problem.

Do you think there are technological limitations as to the kinds of standards we ought to be implementing in our metropolitan areas to deal with particular pollutants?

MR. TELLER. I think that is a rather difficult question to answer. We have a technology. We don't have the proper psyche of technology, if you will. There are two kinds of pollutions, at least from an engineer's viewpoint. The single stack emission from industry is relatively easy for an engineer to attack in that he can use sophisticated approaches to the control.

For example, we go on stream in three days in Ontario, at Fiberglas, where we have totally looped an emission from a glass plant. There will be no emissions coming out of that plant, water, air, or solids waste.

We have taken the thermal value and the pollutants and returned them both to process. This is the first total loop system. It is an attractive thing for an engineer because it gives him the capability for innovation and he has the competency, the technical competency available to him within the company structure to properly operate the equipment.

Now we come to the major pollution problem, which is the multiple source pollution, the urban pollution problem. Here the approach is not nearly as simple because we can't assume technological competency in operation.

In fact, the system has to be built idiot-proof. It has to be built like the refrigerator we have, like the air conditioner we have. Here industry has put the unit in a sealed box saying, "Keep away. This system will operate in spite of you, not because of you."

Yet, in the attack on the urban pollution problem, technology has failed. It has attempted to take the sophisticated technology of industry and apply it to a people problem.

If my answer were to be restricted to today, I would say we don't have the technology even though we have the fundamental concepts to control urban pollution.

I think you will see a major change within the next year or two. I think much of the change has been prompted by the legislation you have sponsored. But it means a shift in thinking.

Senator MUSKIE. What you are saying is that we have the capability, technological know-how, but we haven't implemented it in terms of hardware.

Mr. TELLER. That is right, sir.

Senator MUSKIE. Do you think this is true of oxides of sulfur?

Mr. TELLER. No. In this case, I don't think it is quite that true. Here we have single-source emissions and one can control the emissions, say, from combustion of fuels.

The problem there is—and I wish we could say all our problems could be solved technologically, but they can't—the power industry is directed towards the production of power. It is not in the chemical industry.

The control of pollution is essentially that of chemical engineering, the separation of materials. To impose this on people is very difficult. It means a totally new psyche of operation in the company, and people are fearful of change.

This, I think, is one of the major problems in the power industry. There is the technology, perhaps not the most desirable technology, but then, again, we never build the best technology at any one time, is available.

The problem there is that we have attempted to impose upon pollution the same value system of waste that we impose on our normal living.

The restrictions have been that it is uneconomic to recover sulfur dioxide because it is cheaper to buy sulfur than to use the sulfur dioxide from the stack as a source of sulfur.

The objective has been a break-even at \$25 a ton of sulfur. This value system which underlies not only our economy but the Russian economy and everybody's economy, the waste system, is the replacement system, the marginal replacement system.

You use a material until it is cheaper to go back to the source of the material and get more of it.

I think the prime example I have come across is that in the United States we use phosphate rock to a 90 percent utilization and build tremendous mountains of waste.

In Germany, where they use exactly the same phosphate rock, they have to pay for transportation to Germany and their processes are 96 percent recovery.

In other words, their margin has moved up. I think if we are really going to solve this pollution problem, we have to put other factors into this margin. What is the value of human life? What is the value to our environment, to us?

What is the value of this raw material to future generations?

We can't decimate all of the natural resources of the earth and still have any sense of responsibility to future generations.

So that the inhibition here has not been technological. It has been psychological.

Senator MUSKIE. In the case of sulfur, would you say it has also been economic?

Mr. TELLER. Well, if the value system underlies our economic justification. The fact is you can recover sulfur today for a sulfur value in the range of \$35 to \$40 a ton.

Senator MUSKIE. In other words, if we were willing to pay more for sulfur, I guess that would mean imposing some kind of economic incentives in the controls.

Mr. TELLER. Or increase in the cost of production. I think we may all have to pay for a cleaner atmosphere. But the fact is that if you look back two years, sulfur was \$45 a ton on the open market. At that time, the processes were economic. We were on our hands and knees to the Government of Mexico to get sulfur at that time.

The important thing is that we have to place in the value system of our society a factor beyond mere extraction from the earth.

The value system is, I think, beyond the scope of a present complex society. We are still acting in a 17th century complex where, if you run a piece of land until it gets fallow, you move to the next piece of land. As a result, we are running out of air, we are running out of water, and we are running out of resources.

Senator MUSKIE. I am trying to determine the pressure point at which we convert the separation of sulfur: where it will be acceptable.

Mr. TELLER. It will have to come from one of two requirements: One, legal requirements that you cannot emit the sulfur, or, increase in cost of the product of electricity, or subsidy by Federal Government. Until we can shift the value system we will have to provide economic incentives.

Senator MUSKIE. Suppose we chose the first. How long would it take for industry to respond to that kind of prohibition, technologically?

Mr. TELLER. Industry has begun to respond in the area of power. We had our first failure at the St. Louis Electric where we attempted to use the black box technique in order to respond to restrictions to create a solids waste four times the mass of the gaseous waste. That failed.

I would say that with proper incentives, with proper legislation, in 5 years we could have all emissions of the sulfur level stopped in the power industry.

The technology is now here. We are in our second and third generation systems. In fact, people are peddling the systems right now.

Senator MUSKIE. Would you be able to submit a paper expanding on that point for us?

Mr. TELLER. I would very much like to, yes, sir.

Senator MUSKIE. Do you feel the depletion allowance for sulfur would have any impact upon this problem?

Mr. TELLER. No. It might create greater incentives for the mining of sulfur. I think possibly a value of the sulfur, a returnable value of the sulfur, to the companies, a guaranteed level of return, would do this.

The fact is that that sulfur has a value of about \$1 billion a year. If it were recovered, it would have a \$1 billion value annually for society.

But more importantly, it would preserve the natural resources of sulfur that we now have that are being depleted rapidly.

So the problem is that although the return is \$1 billion a year, the cost of recovery is about \$1.2 billion to 1.3 billion. This is inhibiting the development of these processes or the acceptance of these processes.

Senator MUSKIE. Thank you, Dr. Teller.

We would welcome such a paper.

Senator DOLE.

Dr. Teller, your comments on page 1 are limited to S. 3546, but I would assume that the same general comments would relate to S. 3466.

In that bill the words used are "recommended pollution control techniques."

Mr. TELLER. Yes, sir, it would. As a practicing engineer, as one involved in new systems to develop, I am most concerned with stultifying technological achievements. The reason I directed my comments to S. 3546 was that it incorporated a great deal more of control by Federal Government and incentive by Federal Government.

Senator DOLE. Do you have any suggested changes in that language?

Mr. TELLER. Yes, sir. I think that the Government should not recommend. I think it assumes excessive responsibility in doing so.

I would suggest that the statement "recommended control techniques" be replaced by some language similar to "in conformity with the achievements of the state of the art".

In other words, here are your emission standards, and this is what I like about these bills, the emission standards rather than ambient air standards, and you can do this by the present state of the art. As that state of the art improves, you will do more.

This gives the Government a capability to escalate requirements without really imposing excessive demands on industry, because the technology will develop.

I know in Florida when we put in our first system, we were hoping for about 6 to 0.8, which was the old law, pounds of fluoride emission per ton of phosphate processed.

Our first system showed 0.4. The law was then passed at 0.4, but stipulated that were the state of the art to improve, the requirements would escalate. We are now operating at 0.15. This is in a very short period of time.

So I think you do need the flexibility to increase your demands on emissions.

Senator DOLE. Has it been your experience that the most productive research has been government-sponsored and conducted or industry-funded?

Mr. TELLER. Industry-funded has been the most productive. There is profit, there is motivation, there is a great deal of incentive.

Senator DOLE. Do you see any real merit in expanding Federal research in this area?

Mr. TELLER. Not from the aspect of development of technology. From the aspect of the effects of pollution, from the redesign of our cities and megalopolies, if you will—I think there is a very significant input by government.

But when it comes to the development of systems and hardware, the incentive is much greater for industrial achievement. There is profit. I find, at least in my experience in working with both the

government and industry, that where processes are to be developed to be exploited and sold, you will find the major advances will occur in industry.

Sulfur oxide is a perfect example.

Senator DOLE. With the tendency to attack the problem by more Federal funds and Federal research, if you have any suggestions as to where we might achieve quicker, more beneficial results from some other approaches, they would be helpful to this committee, too.

Mr. TELLER. All right, sir.

Senator DOLE. Would that be satisfactory for him to submit the information, Mr. Chairman?

Senator MUSKIE. That will be fine.

Senator DOLE. That is all I have, Mr. Chairman.

Senator MUSKIE. We may be making unreasonable demands upon you, Dr. Teller. Section 104 is the Research section of the law. There are several subsections to it. Rather than take the time this morning to go through them, I wonder if you could review that section and identify what in your judgment would be the most productive areas for Federal funds for research. It is divided into several subsections.

I believe your testimony on this point would be very helpful. Research, obviously, has to be industry-initiated and funded, and I think I tend to agree with you that that can be the most fruitful area for the development of technology.

At the same time, I believe if you explore those areas of Government-funded research, we could avoid duplication and enhance the total research effort.

I wonder if you would look at that.

Mr. TELLER. Yes, sir, I will be glad to.

Senator MUSKIE. There is one other subject on which you could also enlighten us.

I am asking you to submit these papers later because I am under some time pressure this morning and I don't want to miss the opportunity to probe your experience and your knowledge. I am going to do it this way, if I can.

You raise the question of emission standards. I would like to have your views on the relative advantage of national emission standards as against emission standards geared to local ambient air quality requirements, or even ambient air quality standards on a national basis.

There may be some other questions that we will submit to you.

You may have to resign your job to answer all of these things.

Mr. TELLER. No. It is exciting. I have been doing this now with the State of Oregon in their new standards, both on emission and ambient air, so I have been involved in this.

Senator MUSKIE. I think it is terribly important that we have a good record, a helpful record, an informative record, on which to build this new legislation. You can clearly contribute to it.

Mr. TELLER. I accept it and I am very delighted.

Senator MUSKIE. Thank you, sir.

Mr. TELLER. Thank you, Senator.

Senator MUSKIE. Our next witness is Mr. Joseph Germano, director, District 31, United Steelworkers of America.

**STATEMENT OF JOSEPH GERMANO, DIRECTOR, DISTRICT 31,
UNITED STEELWORKERS OF AMERICA, ACCOMPANIED BY JOHN
J. SHEEHAN, LEGISLATIVE DIRECTOR**

Senator MUSKIE. It is a pleasure to welcome both of you gentlemen this morning.

Mr. GERMANO. Thank you, Mr. Chairman. We have made every contribution we can to the problem you have going on.

Senator MUSKIE. I know the Steelworkers have been most interested in pressing for effective legislation in this field.

Mr. GERMANO. I am Joseph Germano. I am the district director of the United Steelworkers of America, who have the privilege of representing the people in the northern part of Illinois and the north-west part of Indiana which takes in the largest steel center in the world, Bethlehem at Great Lakes, National Steel in Porter County, United States Steel and Republic Steel in Lake County, Ind.; Youngstown Sheet and Tube, Inland Steel; in south Chicago the United States Steel, we have the Republic Steel, Inter-Lake Iron, Wisconsin Steel, even though we don't represent them in our union but they are there. Of course, in Gary, we have the great mills. We have the privilege of representing the great steel center of the world.

For the record, I would like to present this overall policy of the United Steelworkers of America, Mr. Chairman.

Senator MUSKIE. It will be accepted, without objection, and will appear in the record.

(The statement referred to follows:)

**PREPARED STATEMENT OF JOSEPH GERMANO, DIRECTOR, UNITED STEELWORKERS OF
AMERICA**

Mr. Chairman, my name is Joseph Germano. I am an elected official of the United Steelworkers of America. I hold the office of Director of a region comprising part of Illinois and Indiana known as the Chicago-Calumet Region. It is a heavily industrialized section of the country and a center of the steel-making industry. I am accompanied by John J. Sheehan, Legislative Director of our Union.

During the last year, our Union has engaged in a very extensive and sustained effort to establish air quality standards in the air quality control regions designated by the Department of Health, Education and Welfare.

As a matter of fact, we have testified at about 16 such hearings. The president of our Union, Mr. I. W. Abel, has been named to President Nixon's Task Force on Air Pollution.

In many communities, we are in active cooperation with citizen coalitions and Mr. Sheehan is a member of the National Air Conservation Commission of the National Tuberculosis and Respiratory Disease Association.

I mention these facts to indicate the degree of our involvement. Our membership has shown a keen responsiveness to this issue because they are reacting not only as citizens to air pollution but also as workers to occupational hazards.

In my own area conditions are critical. Many of the major polluters are being hauled into court. According to disclosure before the Chicago Air Pollution Control Appeals Board two steel firms—Republic and U.S. Steel—poured more grime and grit aloft last year than five years ago. Republic's contribution was 6,000 tons in 1963, and 7,500 tons in 1968; U.S. Steel emitted 30,000 tons in 1963, and 32,000 tons in 1968.

Just recently, station WBBM-TV prepared an *Action Guide on Air Pollution*; the opening paragraph of which I should like to quote:

"Pollution kills. Pollution causes illness. Pollution impairs judgment and response. Pollution damages property, art treasures, clothing, and crops. Pollution even causes major changes in the earth's ecology—changes of incalculable significance.

"Increased deaths are associated with periods of especially high pollution. Those who suffer most are the very young, the elderly, and individuals with chronic pulmonary or cardiac disorders. The general population, however, also suffers. Over five thousand deaths were attributed to air pollution in London as a result of three air pollution incidents between 1952 and 1962.

"In Chicago, following the episode of extreme pollution during the inversion in November, 1969, three times more deaths from tracheal bronchitis were reported than had been projected. City Health Commissioner Dr. Murray Brown stated, "The death rate of tracheal bronchitis in children has been running about 50 percent higher than it was expected."

"A recent study of several types of cancer found significant correlations of mortality with chronic exposure to sulfur dioxide and nitrogen dioxide. A Chicago scientist estimates that a five-fold reduction in Chicago's average annual sulfur dioxide concentration would reduce the number of deaths from cancer by about 800 per year.

"Lung disease is the fastest growing disease in the country, according to Dr. Bertram Carnow, University of Illinois Medical School. It is the second highest cause of people under 65 years of age being forced to retire and live on social security. Dr. Carnow's studies show that people with heart or lung disorders are sicker when pollution levels go up. In a recent study, people over the age of 55 who had chronic bronchitis suffered twice as many days of illness when the pollution level was .04 as when it was .02."

Now, Mr. Chairman, the mechanism through which the issue has been joined has been the public hearings, which are required by the Federal law in developing air quality standards in the designated areas.

Too often in the past, the public has been shut out of the decision-making function. Regulations are produced through government fiat behind closed doors. I suspect that this situation contributes in a great deal to the disillusionment with and mistrust of the government that many citizens have.

However, the participatory democracy, envisioned in this bill, has opened a few doors. Citizens have become "turned on" at a time when many have become "turned off."

Moreover, it is precisely because of the public hearings that decisions on proposed levels for dust and sulfur oxides by state air control boards have been reversed. In the State of Pennsylvania the board—because of the action of a subcommittee well removed from public scrutiny—even rejected H.E.W.'s criteria documents. Our Union participated in a citizens' effort to expose that decision. We were able to obtain the services of Dr. Warren Winklestein, Professor of Epidemiology at the University of California, to testify as a consultant. He had participated in the research project upon which H.E.W.'s criteria rested.

In both Illinois and Indiana citizens were able to toughen standards. None of this would have been possible without the instrumentality of public hearings.

Hence, we are far from being critical of the fact that there are public hearings. As a matter of fact, we think that it is somewhat ironic that the Administration's bill does not contain any provision for the continuation of the public hearings—public confrontation, if you please. By simply promulgating Federal air quality standards, it eliminates the opportunity for citizens to be heard in the control regions. Actually, when the legislation first passed, we felt that the fragmented public hearings could prove to be a delaying tactic at best. At worst, it could be a destructive one if the public did not respond in such a formal atmosphere.

But subsequent events have proved our original fears to be unfounded. The public hearings have actually prevented weak standards from being submitted to H.E.W. It is strange, therefore, that after they have proved effective the proposed legislation would discontinue them.

Actually, our evaluation of the public hearings, if it is to be critical, is that the existing legislation does not make it meaningful enough. Let me explain.

1. Air Quality Standards

(a) In the existing Act, there is no assurance that if the citizens of an air quality region protest at a hearing for strong standards that the governor must accede to their request. The converse is true. If the citizens do not testify, H.E.W., supposedly, is unable to reject weak standards proposed by a governor. However, the governor is under no compulsion to submit stronger standards desired by the citizens.

(b) There are no guidelines in the current legislation with reference as to how the hearings should be conducted. In Cincinnati the citizen organizations

were the last to appear. The *Dayton Journal Herald* headlined an article with these words: "Anger, Protest End Pollution Hearings." I think its editorial comment of December 19, 1969, is most appropriate for this hearing.

"... it is not acceptable, in our opinion, for the State of Ohio to start out by giving the impression that ambient air goals are essentially the private concern of industry, or beyond the basic concern of the public at large. *It is not acceptable and, we gather, any effort to diminish the citizen role in establishing—and enforcing—pollution standards will be firmly and properly resisted.*" (Italic supplied.)

We feel that a more proper balancing of public witnesses should be detailed in such a guideline. Moreover, notice of hearings should be made well in advance since it is not possible to organize an effective and responsive citizen participation in a short period of time.

Furthermore, we have found that the hearings have not become the public forum which they should be. In most of the air quality regions, there was no attempt by state officials to translate the proposed standards into understandable language. Standards were proposed in terms of micrograms or parts per million for long- and short-term duration without any relationship to the H.E.W. criteria documents. We had to scurry around first to get translators and then analyzers. If it were a true public forum, then this information would have been given to the citizens so that they could properly relate to what the state had proposed.

2. Implementation Plans

(a) The current law does not require that hearings be held to determine the effectiveness of the emission control standards or strategy developed to implement the air quality standards.

Perhaps, the citizen has a right to demand certain information from control agencies as to the required reductions to meet the standards; the sources of pollution and the capability of monitoring stations; and the effectiveness of the emission controls. But this information should become part of the public record through public hearings. We recommend, therefore, that hearings be mandated for proposed implementation plans as well as air quality standards.

(b) Furthermore, we look upon the implementation plan as a combination of various options to reach the desired goal. Hence, in order for citizen groups to respond, the control officials should be required to detail the various alternatives that could be pursued.

All of these plans will involve costs to the community—either economic or social, or both. The citizen, if he is truly to participate in the decision-making, should be supplied with sufficient information so that he can make a judgment as to what direction social planning in his community should be headed.

Although emission control does mean installing electrostatic precipitators in smokestacks of steel mills and abatement facilities in other industrial processes, it means more than that. What we are really talking is a whole restructuring of our cities. We are talking about mass transit systems versus continued expansion of highways. We are talking about plant location and more adequate land-use.

We must, therefore, have spelled out in the law a requirement that there be published the specific alternatives to control our environment. Only in this way can we make legitimate decisions as to the type of substantial change we demand and commit the financial resource to affect that change.

Actually, Mr. Chairman, we have now effectively moved into a real discussion of the quality of life in our industrial communities. We are engaged in the business of social planning. It would be a tragedy to cut short the dialogue and the opportunity it presents by eliminating public hearings.

The control of the environment is a social issue and, as such, demands the utmost in public participation. Industrial democracy has always meant for us an expanding role of the union in the decision-making function of the industry.

Participatory democracy can mean no less a role for the citizen in the making of far-reaching decisions to protect the environment and insure a better quality of life.

Mr. GERMANO. Now I would like to make a few remarks and observations of my own.

Being privileged to be a citizen of that great city of Chicago, born and raised there, being privileged to be raised in the mills of South Chicago, and I worked there as a boy, and then my years of having

the privilege of representing the Steelworkers where I come from, I know, I think, a little bit about the air pollution.

I probably couldn't tell you what we are going to do with it, any more than I would tell you, even though I believe in putting a man on the moon, how you put him up there.

I think we have the ingenuity in this great country of ours that whenever we decide to do something and we absolutely feel it is necessary, we will do it.

I feel that resolving this question of air pollution is absolutely necessary.

I am concerned, gentlemen, about the rumors that I hear, and I imagine it is a fact, that there are people in the Administration who feel that now we have had sufficient public hearings, that we know all about air pollution.

I think that we make a grave mistake if we deny the people of this great country of ours future opportunities to testify at these public hearings.

Senator DOLE. May I ask a question there?

Senator MUSKIE. Yes, indeed.

Senator DOLE. I assume you have reference to S. 3466.

Mr. GERMANO. If that is what it is, then, that is what it is, Mr. Senator. I haven't read the bill. It has just been brought to my attention by my people. This is what I am referring to.

If that is the bill, then that is what I am referring to.

Senator DOLE. I might respectfully suggest that you do read it because it does provide for public hearings prior to implementation of a State plan, which I think you concur in in your statement filed for the record.

Mr. GERMANO. If it provides for the hearings, I am happy to hear that.

Senator DOLE. I think it is a different place for the hearing. We are talking about comments. We discuss setting national standards and we are talking about public hearings to implement the State plans, as I understand it.

Senator MUSKIE. The issue is whether or not we should have public hearings in connection with the setting of standards or whether the standards should be set on a national basis by the Federal Government with public hearings at the State level only for implementation of the standards that have already been set.

That is the issue as proposed by the legislation.

The present law provides for public hearings in connection with the setting of the standards on a regional basis. We have had some experience with that. You have testified in such hearings.

Mr. GERMANO. We did, Mr. Senator, we did testify in those areas, and I feel the people should be permitted to continue in those hearings because every day we have more and more people who are interesting themselves in the air pollution problem.

I know my union for the last 30 or 35 years has constantly talked about these things and informed our members and encouraged our members to participate in this problem.

We felt we weren't only around just for the purpose of negotiating wages, hours and working conditions, but we must concern ourselves with the affairs of not only our members but the people in the community.

Mr. Senator, you mentioned these children, the young people. I saw these children here this morning. These are the people who are greatly afflicted with this air pollution. The older people are greatly afflicted with the air pollution. The women are very concerned about the air pollution in these towns and cities.

There are more women every day who have engaged themselves in this question of air pollution because they can tell you a pretty good story about how it has affected their homes, the livelihoods of their children, the expenses around the home, what it takes to clean a home because of the air pollution.

Take the average home in a situation of that kind and you probably will have to paint it in 4 years, if you want the home looking anything like a home should look.

You take the same kind of home situated some place in the country and it might be 10 years before it needs a paint job. The cleaning inside the home because of these pollutants is increasing. You can't keep the stuff out.

In the mill towns, you can go around in the nighttime and see the graphite because of the pouring of the steels flying around for miles, and you wonder what these little specks are on your clothes.

These things are things that the kids, the people, breathe.

We take and say we want to do something about this, but then we say we don't want to give the opportunity to these people. There should be more hearings.

I am afraid, gentlemen, that if we don't give these kids—and you saw them here—if we don't give these people the further opportunity to assist in this and give their feelings, it will be wrong. Don't let them feel that they are being shut off.

If they haven't yet been given the full opportunity to testify, they should be.

Let me give you an example. The other day I was in my office and I got a call from a local union of mine, 1966, Sheet and Tin Mill, in Gary. They did not know I was coming here but they came in and wanted to talk to me because of a grievance problem they had. They wanted to report to me that here is a situation here, in the plant with this air pollution, the company built a big shed and it was supposed to have made some kind of an outlet so that the bad air could go out. They say it is not effective yet.

However, we all must understand here is the air and they did attempt to do something for the purpose of getting some clean air where the people were working. But all this unclean air is going out to the people in Gary to breathe.

I had a district conference not long ago. There was a conference in Peoria, and resolutions were adopted by our people. People were threatening to strike because of conditions, not only the conditions in the plant but for the purpose of putting pressure on people so that they will continue to do something about these things, and not years from now, 2 years from now, or 5 years from now, but we must move now.

These kids are growing up and we can't wait until our young ladies and young men are grown up, and still not see the results of what we are talking about.

One of my boys went into a hearing in the city of Chicago, in one of these hearings, he was asked, "If you do what you are talking about, isn't it possible that some of these plants will have to shut down and you will lose jobs for your people?"

"Yes, that is possible. We may lose jobs for our people."

I said at a conference in the city of Peoria, "If it is necessary to lose 300 or 400 jobs to save the lives of 3,000 or 4,000 people, then that is what is going to happen."

I think it is a very serious problem. I would rather see the hearings continue. Give these people an opportunity. If you don't believe that these women are absolutely interested in this situation, go into the steel towns and you will find out.

Senator MUSKIE. They are women whose husbands' jobs are involved.

Mr. GERMANO. That is right, absolutely right.

As an example, here sometime ago, the Republic Steel Co., when they started to put new open hearths over in South Chicago, I felt that because the company was trying to put in a new open hearth, and all companies are doing it, give this company an opportunity for the purpose of establishing itself in a competitive field.

I, as a union representative, appeared before the authorities in the city of Chicago for the purpose of giving them an additional time so that they could adjust this so that they wouldn't pollute the air.

The members of my own union whose jobs were involved at the Republic Steel plant in South Chicago condemned me and criticized me, and they opposed what I was doing, and their jobs were involved. It was not my job, but it was their jobs.

This old philosophy that when you see the smoke rolling out of the tops of the blast furnaces there is prosperity, doesn't go anymore. The people don't look at that anymore. Prosperity doesn't mean anything if they are not going to live to enjoy the prosperity.

Senator DOLE. Could I interrupt you at that point?

Mr. GERMANO. Certainly.

Senator DOLE. I was here when Secretary Veneman testified, and he made it rather clear that it was certainly not the intent to preclude public participation in standards setting.

He clearly indicated that public hearings should be a part of the setting of more stringent standards by States under the authority of Section 109 in the existing law, which would be preserved.

I note in your statement you find some fault with the hearings held under existing law. You indicate, first of all, that they have not become the public forum they should be, and also you make reference to the fact that in the existing act there is no assurance if the cities of an air quality region protest the hearing that the Governor must accede to their request.

Apparently, your comments with reference to public hearings are aimed not only a proposed legislation, but also at existing law, is that correct?

Mr. GERMANO. Mr. Senator, may I say this: In your public hearings, most of the public hearings that I know of, locally, as far as I am concerned, are a farce. I will tell you why I think they are a farce. There is no attention paid to them. They hold the hearing, and they go through the motions. They go through the motions but nobody

follows up. It has gotten to the position where, many people—even these women—could easily be discouraged the way these public hearings are conducted.

They listen to witnesses who give good testimony and suggestions, and maybe ideas, and that is the last you hear about it. You don't read about it in the newspaper. You don't see it on television.

Senator DOLE. I share some of the views you have expressed. I have had some experience with the Corps of Engineers. They hold public hearings on projects after they have decided where to put the dam and the case has been made.

In many instances public hearings are simply window-dressing and merely conducted in compliances with existing laws and regulations. On the other hand, I would guess that some public hearings are very worthwhile and certainly they should not be discontinued. Maybe they should be made more meaningful, as you indicate.

Mr. GERMANO. Certainly. Let me give you an example of what I mean.

In the City of Chicago, I read in the newspaper one morning that 10 companies are being cited for polluting. Lo and behold, I see no mention of Republic Steel and United States Steel Corporation; not a thing. This just happened the other day. Those companies were not cited.

But this morning I pick up the Chicago Tribune and I see that the U.S. Steel Company has been caught with their pants down, you might say, in throwing dirty water into Lake Michigan. It was only two weeks ago when they cited 10 other companies for polluting and they didn't say a thing about the United States Steel Corporation and the Republic Steel Corporation.

Senator DOLE. What is your point?

Mr. GERMANO. I use this to show how easily the people are deceived. It works like this: in a blast furnace you have a bleeder pipe, which is a pipe that discharges the dirt and excess gases.

They kid the public, and here is how they do it. They don't open those things up in the daytime anymore. When nighttime comes along, they open these valves, these bleeder valves, and the people have to breathe what comes out. Everybody hasn't air conditioning you know, in these towns. Believe it or not, even the steelworkers don't all enjoy air conditioning in their homes, so they have to open the windows in the summertime if they want to get some of that nice Lake Michigan breeze mixed with this gas from the blast furnaces.

These are some of the things that have not been told. These are some of the things you don't give the people an opportunity to tell about. If you do give them the opportunity, you don't say or do anything about it. These women from South Chicago, Gary, Hammond, east Chicago—where all the oil refineries are—they can tell you. Yes, their families and jobs are involved.

I say, gentlemen, that you have to listen to these people. You know, we talk a lot about these young people demonstrating. There is much criticism of them. Maybe some of it is justified, but I think a lot of the criticism is not justified.

These young kids that you see here today, and thousands upon thousands of them coming along, they are going to be a little older and they too will be able to parade and demonstrate. When that hap-

pens, they won't be by themselves demonstrating and trying to put pressure where pressure ought to be.

They will say, "If it is necessary that you have pressure, then there will be pressure."

As a union, I would be very happy if we could, in collective bargaining, sit down with the companies and say, "Look, let's bargain on this thing. We have some ideas. Let's do it."

But it is impossible. It is truly impossible. Like in many things, we have had to have the assistance of the Federal Government, or legislation. This is one of the big reasons for this.

Some people ask: Why does labor lobby so much? We have to. You can't always get things by collective bargaining, even though you are a strong labor union. When you concern yourselves about these things outside the plant, critics will often say, "Well, you should only concern yourselves about the things in the plant," forgetting that the people outside the plant are the families of the members of our union. If they are not members of our union, they are fellow citizens of the community, and they are kids who have to be taken care of now and given the necessary attention now, today, not when they are young men and young women.

I think this is the obligation of all of us. If it takes more hearings, and if it takes hearings to make these people understand we want to hear you—we don't want to hear you in Washington by masses, we don't want you to come down here as 10,000, 15,000, or 20,000, or go to Springfield or Indianapolis, and I use these two cities because these are the capitals of my two great States—we think that is the proper thing.

You have to show them it is not the proper thing because they can do this in an orderly manner, and show that you are concerned about the welfare, the welfare of all of these people.

Sometimes we say we are concerned, but I think we go about it in a very, very funny way about the concern. A fellow said to me, one of my own union members, one day, "Boss, we are not anti-international."

I said, "Well, if you are not anti-international, you go about it in a helluva way demonstrating that you are pro-international."

As the good Senator pointed out about the kid saying about the cabbage smell, there is a lot more than just cabbage smell. These kids will grow up and realize it is not cabbage smell that they are smelling.

Gentlemen, I have taken up a lot of your time. I appreciate it. I can talk for a long time. I could not add anything more to it other than probably getting myself a little more excited about it, because I am very, very much interested in this thing, and my people are. The people of the State of Illinois are. The people of the State of Indiana are. The women are, and their husbands' jobs are definitely involved in these things.

I say God bless them. they know what they are doing. We want more support from them. This union is going to support them.

One of my boys went out and testified. Occasionally a newspaper will write about you. I get letters from people in the State writing to me asking me if I needed assistance. They say to me, "Mr. Germano, keep up the good work." I am going to do everything I possibly can.

This union will do everything we possibly can to assist these people.

This reminds me, Mr. Chairman, and Senator, when I was involved

in the dunes fight, and I was definitely involved in the dunes fight because I felt that the dunes should be saved for the people not only of the State of Indiana but for the people of Illinois. We had the same thing. Everybody likes to have recreational spots for the people.

But I think the record shows how many people were for it and how many people weren't for it. If it hadn't been for the gallant fight put up by my good friend Senator Douglas, with all the help from these same women—women—people who are fighting today, we wouldn't have had dunes, not part of the dunes today. Let's not do this with air pollution.

Thank you, Mr. Chairman, and thank you, Senator, for your very kind attention. I hope I haven't been too loud. This is a characteristic of mine. I am a steelworker, you know.

Senator MUSKIE. Our next witness is Mrs. Robert Jaskulski, chairman, Southeastern Wisconsin Coalition for Clean Air.

I am advised she is unable to be present. We have her prepared statement and will insert it in the record at this point.

(The statement follows:)

PREPARED STATEMENT OF MRS. ROBERT H. JASKULSKI, CHAIRMAN, SOUTHEASTERN WISCONSIN COALITION FOR CLEAN AIR

The Southeastern Wisconsin Coalition For Clean Air welcomes the opportunity to appear before this subcommittee to discuss air pollution legislation and the value of citizen action in the development of air quality standards.

The SEWCCA has been organized as a result of the air quality workshop sponsored by the Conservation Foundation, held in Milwaukee on November 18, 1969. Many concerned citizens attended this event and felt an urgent need for citizen participation to get the air pollution problem under control.

On December 1, a meeting was held to form the Coalition which includes conservation groups, civic clubs, garden clubs, labor organizations, educational groups, businessmen, medical societies, community service organizations and others. To date approximately 60 groups comprise the Coalition and we are continually soliciting new members. The purpose of the Coalition is to educate citizens about air pollution problems and control and to promote responsible citizen participation at public hearings.

A technical committee of twelve has been organized to advise the Coalition about air pollutants and their effects on the quality of life. The members of this committee are presently working in the fields of botany, biology, meteorology, economics, medicine and engineering.

Aside from our ongoing education programs, we have participated in public hearings to establish state rules for limiting emissions of air pollutants. An unprecedented number of citizens presented testimony at this hearing.

We are now preparing to take action at a public hearing on March 20, to change the makeup of the Milwaukee County Air Pollution Advisory Board. At this time the board is comprised of five engineers from major polluting industries in the area. We are asking for broad community representation including a physician, ecologist and other citizens.

Our next major activity will be conferences to prepare citizens to testify at public hearings on state proposals for air quality standards as required by federal law.

The Coalition has been studying the entire approach to air quality control and how to make it truly effective. Wisconsin is currently in the process of establishing state-wide rules to limit emissions of air pollutants without first establishing air quality standards. Also, a seven county area in the southeastern region of Wisconsin has been designated as a federal air quality region. The state is finalizing proposals for air quality standards for this region. However, they are not required to establish limits of emissions to meet these standards.

Our Coalition has been working to keep citizens aware of this dual approach to air quality control in the State. Because of this responsibility we have come to some definite conclusions about what is needed to have a successful program of air quality control.

There is no doubt about the necessity for designating air quality regions in the entire state. This will allow flexibility in regulations to insure cleaner air in the metropolitan area and non-degradation of clean air in less developed regions.

Both air quality standards and emission standards must be required. Absence of one makes the other ineffective. Both standards should be reviewed at least every five years.

The members of the Coalition are concerned with the lack of requirements for monitoring air pollutants. Legislation should foster, or probably require, adequate air sampling systems. Unless accurate air sampling is done and compared with air quality standards, enforcement of emission standards may result in either excessive costs to industry and to the public or in deterioration of air quality.

Current data from monitoring systems must be available to the public to determine whether controls are, in fact, resulting in cleaner air. When Coalition members were asked for opinions of the proposals and objectives of S3546, the word most often used was "excellent." We are also in favor of requiring the state to hold public hearings not less than thirty days following publication of all proposed plans. This courtesy has not been extended to us in the past; though we did request such consideration. Citizens must be assured sufficient time to evaluate all proposals in a responsible manner.

We join the senators who recognize the need for regulation of fuel and fuel additives and for improved controls over motor vehicle emissions. The Coalition strongly opposes the exemptions of vessels, aircraft, vehicles or engines from any air pollution control regulation solely because they are scheduled for export. We can find no reason to justify this exclusion.

A limited survey was made regarding the financial aspects involved in air pollution control and the availability of federal funds. Though we are not in a position to evaluate the actual figures proposed, we do have some comments. People who might qualify for federal funds say it is next to impossible to get through the red tape of making application for the money. While they recognize the need for accurate reporting they are of the opinion that the report forms are much too detailed and time consuming.

Most members of the Coalition are concerned about the gap between funds authorized for air pollution control and funds appropriated. If you feel legislation is important enough to be passed, you should be equally concerned with adequate funding as originally authorized.

We hope this testimony will give you a better understanding of citizen action in our community and our concern for clean air. Thank you for this opportunity to appear here today.

Senator MUSKIE. Our witness is Herbert Richey, Chairman, Natural Resources Committee of the Chamber of Commerce of the United States.

STATEMENT OF HERBERT S. RICHEY, CHAIRMAN, NATURAL RESOURCES COMMITTEE, CHAMBER OF COMMERCE OF THE UNITED STATES, ACCOMPANIED BY JOHN J. COFFEY, SENIOR ASSOCIATE FOR NATURAL RESOURCES AND ENVIRONMENTAL QUALITY

Senator MUSKIE. You may proceed, Mr. Richey.

Mr. RICHEY. Thank you, Mr. Chairman.

Mr. Chairman and committee members:

I appreciate the opportunity to appear before you to present this statement on behalf of the Chamber of Commerce of the United States.

I am Herbert Richey, President of the Valley Camp Coal Co., Cleveland, Ohio.

I serve on the board of directors of the national chamber and as chairman of the Chamber's Natural Resources Committee.

Accompanying me is John J. Coffey, senior associate for Natural Resources and Environmental Quality, Chamber of Commerce of the United States.

First, I want to compliment the members of this committee for their dedication and determination to conserve the quality of our air and water.

Your leadership, your inquiries and your consideration of the complex environmental factors, constitute a public service of the first order.

The Air Quality Act of 1967 developed by this committee presented a strong but reasonable program for the management of our air resources. Implementation of this program, unfortunately, has not been up to the expectations of this committee, the Congress, and all Americans.

The national chamber shares the concern voiced by President Nixon in his Environmental Quality Message:

This program (Clean Air Act) has been the first major Federal effort to control air pollution. It has been a useful beginning. But we have learned in the past two years that it has shortcomings.

Federal designation of air quality control regions, while necessary in areas where emissions from one State are polluting the air in another, has been a time-consuming process. Adjoining States within the same region often have proposed inconsistent air quality standards, causing further delays for compromise and revision.

There are no provisions for controlling pollution outside of established air quality control regions. This means that even with the designation of hundreds of such regions, some areas of the country with serious air pollution problems would remain outside of the program.

The national chamber applauds the comments of Senator Muskie upon introducing S. 3546, when he stated:

Congress has passed laws to combat air pollution since the early 1960's, but the administration of the Federal programs has not matched the gravity of the problem.

What are we to tell the residents of our large cities where the air pollution endangers public health? What are we to tell our citizens living in rural States who want to preserve their clean air? And what are we to tell the young people who are alarmed over what they must inherit?

Must we tell them that while their leaders proclaimed the environmental crisis, the agencies charged with cleaning up the air could not keep up as time ran out?

The Air Quality Act of 1967 can be a most effective tool to accomplish the enhancement of our air resources, but the national chamber agrees with both the President and the chairman of this subcommittee that the inability of the Federal agencies to implement this act has resulted in the delay of remedial action necessary to solve air pollution problems. It is clear that several amendments to the Clean Air Act are necessary.

Contacts with the National Air Pollution Control Administration (NAPCA) over the 2½ years since the Air Quality Act was signed into law have revealed that its personnel are both dedicated and capable.

The national chamber commends the NAPCA staff, but stresses that the tasks assigned to NAPCA by the Air Quality Act, given the present budgetary and personnel restraints, have proven extremely difficult, if not impossible, to fulfill. Even assuming that the budget and the staff of NAPCA were expanded, the present tasks assigned offer a full program of work.

The proposals before this subcommittee to assign a substantially increased workload to NAPCA can only serve to overburden this agency and result in continued delays in the fight against air pollution.

To accelerate air pollution control programs, there must be greater utilization of local and State air pollution control agencies.

The National Air Pollution Control Administration and the Department of Health, Education, and Welfare cannot direct every program of air pollution control—not if we are to solve our pollution problems expeditiously.

Federal authority should be to insure that adverse air quality does not injure the public health, that a mechanism be established whereby State and local programs of air quality can be adopted, and that air pollution control programs proceed rapidly through enforcement of a timetable for action.

Specifically, the national chamber proposes amendments to the Clean Air Act which would provide for the following:

1. The designation of air quality control regions (both intrastate as well as interstate) for all sections of the country.

To accomplish this designation, the national chamber recommends a provision similar to section 3 of S. 3546, Senator Muskie's bill. Primary responsibility for designation of intrastate regions would rest with State authorities, but, if no State action were taken, the Secretary of Health, Education, and Welfare would make these designations.

2. The promulgation of minimum national ambient air quality standards to protect the health of all Americans.

Adequate data on the health effects of various air quality levels does not now exist. However, this should not deter the setting of minimum national ambient air quality standards to protect public health.

The national chamber urges that the Department of Health, Education, and Welfare, using the health data now available and the criteria issued by HEW under the Clean Air Act, proceed to promulgate these standards, after providing for review by all interested parties. This review will be extremely vital due to the lack of sufficient health data. Continuing research into the health effects of air quality levels will be necessary, and provision to amend these standards, based upon this research, should be included in the language of the Act.

Senator DOLE. I have another obligation at 11:15 and I wanted to make one comment and see if I comprehend generally the thrust of your statement.

As I understand it with the suggested amendments you are now about to discuss, you favor extension of the 1967 Act, is that correct?

Mr. RICHEY. Yes, sir, with amendments to make it more effective.

Senator DOLE. Right. You have not suggested, as I looked at your statement rather hurriedly, specific language.

Do you have suggested language available?

Mr. RICHEY. We can provide that.

Senator DOLE. That would be helpful to the staff.

Mr. RICHEY. The chamber is for cleaning up the air and we want to do what we can to help with legislation to get the job done.

Senator DOLE. This has been based, as I understand, on the personal experience you have had in the field.

Mr. RICHEY. That is right.

Senator DOLE. Your changes are based on personal experience, is that right?

Mr. RICHEY. Yes, sir.

Senator DOLE. I regret I must leave early.

Thank you, Mr. Chairman.

Mr. RICHY. 3. The adoption by the States of regional air quality standards at least as stringent as the national public health standards.

Following the designation of the air quality control regions and the final promulgation of the national minimum air quality standards by the Secretary, the basic procedure detailed in section 108(c) of the Air Quality Act (the adoption of ambient air quality standards by the States) would apply.

The regional public hearings to be held in accordance with section 108(c) prior to adoption of air quality standards by the States would consider the merits of establishing regional ambient air quality standards more stringent than the national standards, considering such factors as the public welfare, the existing technology, and the costs and benefits of various air quality levels.

Since the local factors which comprise the "public welfare" of each region will differ, and since, in some cases, the national public health standards will not protect the "public welfare" of a particular region, each region must carefully consider the ambient air quality required for that region.

The adoption of more stringent standards would proceed only with respect to those factors covered by any criteria issued by the Secretary in accordance with Section 107 (b) and (c) of the Air Quality Act.

4. The streamlining of Federal approval of regional air quality standards.

Because many more regions will be created than was contemplated when the Air Quality Act was drafted, and because ambient air quality standards have been approved for only one region designated under the present Act, the Federal approval procedure should be streamlined, not expanded.

Since the regional air quality standards must be at least as stringent as the national ambient air quality standards to protect public health, the Secretary can rapidly check the State-adopted standards to ensure compliance.

The national chamber recommends that the present detailed approval procedure of Section 108(c) (1), which includes that the Secretary must evaluate the implementation plans to achieve the air quality standards, be modified to eliminate this evaluation.

Instead, the State(s) would submit, along with the regional standards and a means of enforcement, a timetable for the achievement of the national air quality standard.

The Secretary would then review the standards, enforcement mechanism, and timetable, approving them if he determines that this "package" is consistent with the purposes outlined in Section 108(c) (i) of the Air Quality Act.

5. The expansion of Federal enforcement to intrastate violations of the national ambient air quality standard for public health.

In addition to the Federal authority detailed in the Air Quality Act, Federal enforcement action, as detailed in Section 108(c)4(i), should be expanded to include intrastate situations where the ambient air quality is below the national ambient air quality standard. This would result in the elimination of Section 108(c)4(ii).

6. The establishment, for non-stationary emission sources, of Federal emission standards.

Because of the inherent mobility of aircraft, vessels, and other vehicles, Federal authority, similar to the present Federal authority over motor vehicles, to establish emission standards for these sources should be enacted.

With the enactment of the above amendments, the Air Quality Act—a strong, sound approach to the Nation's air pollution problems—will achieve the environmental goals anticipated by this committee when you drafted the Act in 1967.

To complement this Federal program, the national chamber urges increased action by State and regional authorities. These actions will be necessary to meet the regional air quality standards (once approved by the Department of Health, Education, and Welfare) and the timetable developed to achieve those standards.

The States, singly, and, where appropriate, with other States through interstate compacts and/or air quality regions, should adopt specific emission limitations designed to meet the regional air quality standards.

These emission limitations would be scheduled within a financially-achievable timetable and would be capable of being achieved technologically.

These emission limitations, based upon the air quality standards, would be best established by regional air quality control agencies, and then be adopted by the States.

The limitations, enforceable under State law, would not be uniform emission limitations, but would vary from site to site to reflect the varied characteristics of each air region.

Regional authorities are in a unique position to establish emission limitations which are responsive to local needs and to local topographical, meteorological, and geographical conditions.

As previously stated, Federal enforcement authority, in addition to the emergency injunctive power already in the Clean Air Act, would occur in those cases where the national ambient air quality standards are violated and the State authority fails to act.

While continuous monitoring of each emission site is both impractical and unfeasible, these emission limitations would serve useful purposes:

Each emission site would have a limitation which it would have to plan to meet. Since these limitations would be set individually to achieve the ambient air quality standard, and would be within the limits of existing technology, compliance with these limitations should proceed in an orderly fashion.

Each site could choose for itself the best method of meeting its emission limitation.

In cases where the regional air quality standards are violated, the regional authorities could check each emission site to determine non-compliance with the emission limitations and proceed with remedial action—judicial action, if necessary.

To encourage local action designed to manage environmental quality, the national chamber has recently published, and distributed to local chambers of commerce, "Improving Environmental Quality—Business-Led Action to Improve Water and Air Quality."

This booklet, a copy of which is included along with this statement, has been designed to assist local chambers and other community

groups to organize and implement effective air and water pollution control programs.

In this presentation of our proposed amendments to the Clean Air Act, many issues contained within the legislation now before this committee, have been covered. I would now like to briefly discuss several issues not previously mentioned in this testimony :

MOTOR VEHICLE—AIR POLLUTION CONTROLS

The national chamber does not, as a matter of policy, address itself to a problem specific to only one segment of industry. The industries concerned with the motor vehicles are better qualified to discuss these issues.

REGULATION OF FUEL COMPOSITION

Since the section of S. 3466 relates to regulation of all fuels used in transportation (not just motor vehicles), the national chamber will address this issue.

The national chamber is opposed to Federal regulation of fuel composition and additives. The establishment and enforcement of Federal emission standards for nonstationary sources (motor vehicles, aircraft, vessels, and so forth) will enable all segments of industry involved with this problem to seek the most economic and practical method to achieve those standards.

All alternative solutions could be explored: higher-performance emission control devices; pollution-reducing fuel additives; engine modification; or, the altering of fuel composition.

STATIONARY SOURCE EMISSION STANDARDS

Much discussion occurred in 1967, when this committee considered the Air Quality Act, over the proposal to establish national emission standards.

In view of the sound arguments opposing national emission standards presented at that time, the Air Quality Act was structured to authorize a study of the need for national emission standards.

The report of this study, now completed, has never been publicly issued—but indications are that its original conclusions do not favor national emission standards.

I will not belabor this committee with the arguments against national emission standards. The 1967 hearings record of this committee on the Air Quality Act contains sufficient testimony.

The national chamber is opposed to national emission standards because they are not responsive to the needs and demands of local conditions.

The proposal (S. 3466) to add a new section 112 to the Clean Air Act should be rejected at this time for two additional reasons: If there is an imminent and substantial danger to health of persons, the Secretary can seek immediate injunctive relief under the authority of section 108(k) of the Clean Air Act; and no action on the establishment of these standards should be taken until the release and evalua-

tion of national emission standards study required by the Air Quality Act.

In summation, the National Chamber fully supports the Air Quality Act of 1967, but recognizes that delays in the administration of this Act at the Federal level have resulted in delays in solving this Nation's air pollution problems.

The amendments which we have offered are designed to overcome these delays by streamlining Federal action and by requiring strong State and regional action to improve the quality of our air resources.

Senator MUSKIE. I will yield to Senator Randolph at this point. I know he is most anxious to have this opportunity to enter into a discussion with a citizen of his own State.

Mr. RICHEY. By indirection. I am from Ohio, but West Virginia is a good place. My company operates several coal mines there.

Senator RANDOLPH. Thank you, Mr. Chairman.

Mr. Chairman, I am very grateful for your understanding of the problem which I have as Chairman of the Public Works Committee.

I had accepted an invitation to be at the White House for the signing of important legislation which came from this committee, Mr. Chairman, which has to do with the increased protective force for the White House and for the embassies located in the District of Columbia. That signing is at 11:45. I would, of necessity, have to leave in four or five minutes.

At the outset, Mr. Chairman, I want to say to you that Mr. Herbert Richey is—though he might say by indirection—a citizen of West Virginia. It is really an important citizenship that he holds in our State, though he is a legal resident of Cleveland, Ohio.

He is the President of the Valley Camp Coal Company and employs some 2,000 persons in West Virginia in the operation of mines that are under his direction in our State.

Mr. Richey, as an industry executive and as Chairman of the National Resources Committee of the United States Chamber of Commerce, has proven repeatedly that he is an enlightened leader in industry and business in reference to the matters that he discusses with us here today.

I have noted that he has commended the general purposes of Chairman Muskie's bill, S. 3546, and I am very happy to be one of the five members of the Subcommittee on Air and Water Pollution joining with you, Senator Muskie, in the cosponsorship of that legislation.

I think it is important for the record, Mr. Richey, that we have, with the permission of the Chair, the names of those who serve on your National Resources Committee, that we may know the positions these men hold in their own respective companies or organizations throughout the country.

How many are there?

Mr. RICHEY. 48, Senator Randolph.

Senator RANDOLPH. I think rather than just have the names, I think a record is better made when we can define the type of people and from whence they come who worked with you, Mr. Richey, in preparing this paper so that we can give it full consideration.

(The list of names follows:)

NATURAL RESOURCES COMMITTEE OF THE CHAMBER OF COMMERCE OF THE
UNITED STATES OF AMERICA

Richey, Herbert S., *Chairman
President and Chief Executive Officer
The Valley Camp Coal Company
Cleveland, Ohio

Banks, Harvey O., Consulting Engineers, Inc., Belmont, Calif.	Fisher, Joseph L., President, Resources for the Future, Inc., Washington, D.C.
Barrow, Thomas D., Senior Vice President, Exploration, Humble Oil & Refining Co., Houston, Tex.	Forman, Loren V., Vice President, Scott Paper Co., Philadelphia, Pa.
Batten, Fred W., Senior Vice President, Operations, Columbia Gas System Service Corp., New York, N.Y.	Hamel W. Rogers, Vice President of Corporate Affairs, Raytheon Co., Washington, D.C.
Bent, Robert D., Senior Vice President, Atlantic Richfield Co., Philadelphia, Pa.	Hamrick, Forrest G., Vice President—Finance American Smelting & Refining Co., New York, New York
Blaschke, Edwin H., Vice President, Brown & Root, Inc., Houston, Tex.	Harris, Melvin G., District Traffic Sales Manager, Pan American World Airways, Inc., Fairbanks, Alaska
*Bolack, Tom, Owner, B Square Ranch & Experimental Farm, Farmington, N. Mex.	Harris, Shearon, President, Carolina Power & Light Co., Raleigh, N.C.
Booth, Darrell, President, Kampgrounds of America, Inc., Billings, Mont.	Harvey, E. P., General Manager, Harvey Sheep & Cattle Co., El Paso, Tex.
Britton, James J., Executive Vice President, Alabama State Chamber of Commerce, Montgomery, Ala.	Kinney, John E., Sanitary Engineering Consultant, Ann Arbor, Mich.
Burke, Joseph M., Shamrock Ranch, Casper, Wyo.	Little, Richard N., General Solicitor, Union Pacific Railroad Co., Washington, D.C.
Cannon, Garnett E., President, Standard Insurance Co., Portland, Oreg.	Mills, W. L., Director of Governmental Affairs, Boise Cascade Corp., Boise, Idaho
Champ, Frederick P., Chairman, Walker Bank & Trust Co., Logan, Utah	Morison, Frank H., Partner, Holland & Hart, Denver, Colo.
Corddry, W. H., Chairman of the Board, Gannett, Flemming, Corddry & Carpenter, Harrisburg, Pa.	Mosebrook, Harry S., Director of Public Affairs, Weyerhaeuser Co., Tacoma, Wash.
*Corette, Robert D., Senior Partner, Corette, Smith & Dean, Butte, Mont.	O'Connor, Robert E., President, Rising Paper Co., Housatonic, Mass.
Degenhardt, Richard K., CCE, Executive Vice President, Asheville Chamber of Commerce, Inc., Asheville, N.C.	Overton, J. Allen, Jr., Executive Vice President, American Mining Congress, Washington, D.C.
Dierks, F. McDonnell, Jr., Assistant Vice President, Dierks Forests, Inc., Hot Springs, Ark.	Plata, Richard A., Coordinator, The Brooklyn Union Gas Co., Brooklyn, N.Y.
Dunn, Stephen F., President, National Coal Association, Washington, D.C.	Pond, William, Executive Officer National Recreation & Park Association, Washington, D.C.
Ecker, N. Boyd, Government Relations Advisor, Mobil Oil Corp., Washington, D.C.	Powe, George R., Assistant Vice President-Mineral, Traffic Department, Northern Pacific Railway Co., St. Paul, Minn.
Ernst, Roger, Manager, Land Department, Arizona Public Service Co., Phoenix, Ariz.	Power, Bernard A., President, Weather Engineering Corp. of America, Washington, D.C.
*Fidlar, Marion M., President, Mountain Fuel Supply Co., Salt Lake City, Utah	

*Scully, William, President, The Scully Estates, Beatrice, Neb.

Short, Robert H., Vice President, Portland General Electric Co., Portland, Oreg.

Silliman, Frederick B., President, Bridgeport Hydraulic Co., Bridgeport, Conn.

Talbot, Donald R., Director, Water Resources Programs, Martin Marietta Corp., Washington, D.C.

Taylor, John R., Vice President, Secretary and General Counsel, International Minerals & Chemical Corp., Skokie, Ill.

Temple, Norman J., Vice President, Central Maine Power Co., Augusta, Maine

Tinnin, Robert P., President, R. P. Tinnin Co., Albuquerque, N. Mex.

Toman, George J., Consulting Engineer, Toman Engineering Co., Mandan, N. Dak.

Tucker, Frederick E., Manager, Pollution Control & Services, National Steel Corp., Weirton, W. Va.

Vice, Leslie T., Vice President, Standard Oil Co. of California, Washington, D.C.

Coffey, John J., *Committee Executive*

Senior Associate

Natural Resources

Community and Regional Development Group

Chamber of Commerce of the United States

Washington, D.C.

*Member, National Chamber Board of Directors.

Senator RANDOLPH. I agree with you at the very outset that Federal agencies can't do the job. I think Senator Muskie and all of us realize that this is true.

Therefore, I say you are right when you declare that there certainly must be a greater utilization of the local and the State air pollution control agencies.

Partnership, cooperation, coordination, understanding, and high purpose and common goals are necessary in improving the environment and adding to the quality of life in America.

On page two of your statement, Mr. Richey, you have stated that the present budgetary and personnel restraints have interfered with the total implementation of the Air Quality Act of 1967.

I said that, too, Mr. Chairman, earlier this week.

I said that I was concerned about the failure of the Budget Bureau and of the Administration to move forward more rapidly and aggressively under the Air Quality Act. I realized that they had certain problems due to changing Administrations. And I said that I am sure they were studying ways in which they can help us, as we want to help them.

We have to realize that these hearings are not held just so we can come together and say, "We are going to work together." Indeed, we have to be definitive and point out, as you have, ways in which this legislation, as well as existing law, can be improved.

The reports which come to us indicate that current staffing, Mr. Richey, of the National Air Pollution Control Commission is considerably below the level of staffing that we anticipated in 1967, at the time we passed this Act.

An evaluation of manpower and training needs at the Federal, State and local levels was to be made under provisions of the Air Quality Act.

The report, and I mentioned it earlier in these hearings, was due in July 1969.

Mr. Richey, it is yet to be received.

There may be manpower shortages that caused this delay, but if we do not mention it, if we do not highlight it, I think we fail in our responsibility.

You have mentioned it, in effect, here today.

So our subcommittee has awaited this report. We await it with interest because an inadequate staff implementing existing law has a very direct bearing, as I know you would agree, Mr. Richey, on any evaluation of the effectiveness of the law itself.

Mr. RICHEY. That is absolutely correct.

Senator RANDOLPH. So the Congress can pass legislation, and the Congress can spell out its intent, but if there is a failure within the agency or agencies to carry out that Act of the Congress, then we must be very careful to follow through as quickly as we can and as thoroughly as we can in oversight hearings.

That is what we are doing here, to a degree.

There possibly may be, Mr. Chairman, one or two questions that I would be asking Mr. Richey, and he can respond to those in writing if we decide to send them to him.

Mr. RICHEY. We would be delighted to do so. Thank you very much, Senator.

Senator RANDOLPH. I am glad that you were here today. You were positive and helpful in your testimony.

Senator MUSKIE. Thank you very much, Senator Randolph.

First of all, may I compliment you, Mr. Richey, on the positive nature of your testimony.

Mr. RICHEY. Thank you very much, sir. It means a lot to hear you say that.

Senator MUSKIE. You disagree about certain recommendations, but I was struck by your taking a positive attitude.

Mr. RICHEY. If I could take a moment, I had second thoughts about becoming involved in the Chamber because I have not had a history of that. But since I have been on this committee I have found very much, I think, a changing attitude and I am proud to be part of it.

I would like to say for our committee, before I was chairman, we went over this in 1967, and since I have been chairman we have gone over it.

My feeling is, of the members who have attended meetings, that their problem is not to try to avoid air pollution but how to cure it, and to do it sensibly and economically. I think that is the sense of this statement.

Senator MUSKIE. I appreciate that attitude.

I have only one or two questions. These are not for the purpose of taking issue with you, but only for the purpose of trying to expose the issue and make a helpful record.

I am doing it with respect to a provision that isn't in my bill, so I guess I am in a position of being objective. That is on the control of fuels.

In your prepared testimony, you express opposition to Federal regulation of fuel composition additives.

I would like at this point to include in the record section 210 of the present law which applies to registration of fuel additives.

We wrote that provision into the law in 1967 because we were concerned that we had no handle, really, on the contribution of enriched fuels and fuel additives to air pollution.

We were frustrated by the problem because we knew so little about the effects of fuel additives. So we thought we would begin by requiring the registration of fuel additives, which would at least put us in the position of knowing what was going into our fuels, what their compositions were.

(The section of the act relating to the foregoing follows:)

REGISTRATION OF FUEL ADDITIVES

SEC. 210. (a) The Secretary may by regulation designate any fuel or fuels (including fuels used for purposes other than motor vehicles), and after such date or dates as may be prescribed by him, no manufacturer or processor of any such fuel may deliver any such fuel for introduction into interstate commerce or to another person who, it can reasonably be expected, will deliver such fuel for such introduction unless the manufacturer of such fuel has provided the Secretary with the information required under subsection (b) (1) of this section and unless any additive contained in such fuel has been registered with the Secretary in accordance with subsection (b) (2) of this section.

(b) For the purposes of this section the Secretary shall require (1) the manufacturer of such fuel to notify him as to the commercial identifying name and manufacturer of any additive contained in such fuel; the range of concentration of such additive or additives in the fuel; and the purpose in the use of such additive; and (2) the manufacturer of any such additive to notify him as to the chemical composition of such additive or additives as indicated by compliance with clause (1) above, the recommended range of concentration of such additive, if any, the recommended purpose in the use of such additive, and to the extent such information is available or becomes available, the chemical structure of such additive or additives. Upon compliance with clauses (1) and (2), including assurances that any change in the above information will be provided to the Secretary, the Secretary shall register such fuel additive.

(c) All information reported or otherwise obtained by the Secretary or his representative pursuant to subsection (b), which information contains or relates to a trade secret or other matter referred to in section 1905 of title 18 of the United States Code, shall be considered confidential for the purpose of such section 1905, except that such information may be disclosed to other officers or employees of the United States concerned with carrying out this Act or when relevant in any proceeding under this title. Nothing in this section shall authorize the withholding of information by the Secretary or any officer or employee under his control, from the duly authorized committees of the Congress.

(d) Any person who violates subsection (a) shall forfeit and pay to the United States a civil penalty of \$1,000 for each and every day of the continuance of such violation, which shall accrue to the United States and be recovered in a civil suit in the name of the United States, brought in the district where such person has his principal office or in any district in which he does business. The Secretary may, upon application therefor, remit or mitigate any forfeiture provided for in this subsection, and he shall have authority to determine the facts upon all such applications.

(e) It shall be the duty of the various United States attorneys, under the direction of the Attorney General of the United States, to prosecute for the recovery of such forfeitures.

Senator MUSKIE. I am sorry that provision of the Act has never been implemented, to the best of my knowledge.

Mr. RICHEY. This must be one of the staff shortages you were talking about.

Senator MUSKIE. It probably is related to the staff shortage.

Mr. RICHEY. We made no comment on that.

Senator MUSKIE. I think if those steps had been taken we would be in a better position to consider additional legislation now, but they were not.

Now, with respect to the provision of S. 3466, beginning at line 15 on page six of the Administration Bill, and continuing to line 17 on page nine, I think that might be inserted in the record at this point.

We will also include an amendment offered by Senator Montoya dealing with the establishment of standards for fuels.

(The documents to be furnished follow:)

[Extracted from S. 3466, Feb. 18, 1970, p. 6, line 15, through p. 9, line 16]

* * * * *

“(b) The Secretary may, on the basis of information obtained under subsection (c) of this section or any other information available to him, establish standards respecting the composition or the chemical or physical properties of any fuel or fuel additive to assure that such fuel or fuel additive will not cause or contribute to emissions which would endanger the public health or welfare, or impair the performance of any emission control device or system which is in general use or likely to be in general use (on any motor vehicle or motor vehicle engine subject to this title) for the purpose of preventing or controlling motor vehicle emissions from such vehicle or engine. For the purpose of carrying out such standards the Secretary may prescribe regulations—

(A) prohibiting the manufacture for sale, the sale, the offering for sale, or the delivery of any fuel or fuel additive; or

(B) limiting the composition or chemical or physical properties, or imposing any conditions applicable to the use of, such fuel or fuel additive (including the maximum quantity of any fuel component or fuel additive that may be used or the manner of such use).

(c) The subsection of section 210 herein redesignated as subsection (c) is amended by striking out “For purposes of this section, the Secretary shall” and inserting in lieu thereof “For the purpose of establishing standards under subsection (b), the Secretary may require the manufacturer of any fuel or fuel additive to furnish such information as is reasonable and necessary to determine the emissions resulting from the use of the fuel or fuel additive or the effect of such use on the performance of any emission control device or system which is in general use or likely to be in general use (on any motor vehicle or motor vehicle engine subject to this Act) for the purpose of preventing or controlling motor vehicle emissions from such vehicle or engine. If the information so submitted establishes that toxic emissions or emissions of unknown or uncertain toxicity result from the use of the fuel or fuel additive, the Secretary may require the submission within a reasonable time of such scientific data as the Secretary may reasonably prescribe to enable him to determine the extent to which such emissions will adversely affect the public health or welfare. To the extent reasonably consistent with the purposes of this section, such requirements for submission of information with respect to any fuel additive shall not be imposed on the manufacturer of any such additive intended solely for use in a fuel only by the manufacturer thereof. Among other types of information, the Secretary shall”; by inserting in clause (2) “the description of any analytical technique that can be used to detect and measure such additive in fuel,” after “above.”; by striking out in such clause “to the extent such information is available or becomes available.”; by striking out “clauses (1) and (2)” in the second sentence and inserting in lieu thereof “the provisions of this subsection”; and by striking out “such fuel additive” in such sentence and inserting in lieu thereof “such fuel or fuel additive”.

(d) The subsection of section 210 herein redesignated as subsection (d) is amended by inserting between the first and second sentences the following new sentence: “The Secretary may disseminate any information, obtained from reports or otherwise, which is not covered by section 1905 of title 18 of the United States Code and which will contribute to scientific or public understanding of the relationship between the chemical or physical properties of fuels or fuel additives and their contribution to the problem of air pollution.” The first sentence of such subsection is amended by striking out “subsection (b)” and inserting in lieu thereof “subsection (c)”.

(e) The subsection of section 210 herein redesignated as subsection (e) is amended (1) by adding "or subsection (b)" after "subsection (a)"; and (2) by striking out "\$1,000" and inserting in lieu thereof "\$10,000".

(f) The amendment made by subsection (e) (2) of this section shall be effective with respect to any fuel or fuel additive to which a regulation issued under subsection (a) of section 210 of such Act or a standard established under subsection (b) of such section, as amended by this Act, applies.

* * * * *

[S. 3229, 91st Cong., second sess.]

AMENDMENTS Intended to be proposed by Mr. MONTORA to S. 3229, a bill to amend the Clean Air Act in order to extend the authorizations for such Act, to extend the provisions of title II relating to emission standards to vessels, aircraft, and certain additional vehicles, and for other purposes, and to provide for a study of noise and its effects.

On page 13 between lines 7 and 8 insert the following :

"ESTABLISHMENT OF STANDARDS FOR FUELS

"SEC. 211. (a) The Secretary shall, as soon as practicable, prescribe (1) such standards with respect to the composition of fuels of all types as are necessary to protect the public health and welfare and carry out the policy of this Act, (2) such rules and regulations as are necessary to prevent the manufacture or processing for use in the United States of fuels not meeting such standards, and (3) after consultation with the Secretary of the Treasury, such rules and regulations as are necessary to prevent the importation into the United States of fuels not meeting such standards. Included with such standards shall be specific methods by which fuels shall be tested by the Secretary to determine if they conform to such standards.

"(b) Any person who violates any provision of rules and regulations prescribed pursuant to this section shall be subject to a fine of not more than \$1,000. Each day on which any such violation occurs shall constitute a separate offense.

"(c) All action taken under this section in prescribing standards, rules, and regulations shall be taken in conformity with the provisions of title 5, United States Code, relating to administrative procedure."

On pages 13 through 17, redesignate sections 211 through 213 as sections 212 through 214, respectively.

Senator MUSKIE. Having directed these various provisions to your attention, I would like to ask this question: Is it clear that the composition of fuels is important in controlling emissions from motor vehicles or any other fuel-burning mobile sources?

This provision is not in my bill, but I am very receptive to it. I think it is perhaps the most important addition to air pollution legislation contained in the Administration Bill.

It makes very good sense to begin now this kind of rather moderate approach to the control of fuels, fuel composition and fuel additives.

It seems to me it is better to begin this kind of step now. I wish it were following on with fuel implementation of the 1967 provision, but without that it certainly makes sense to begin at this point the process of coming to grips with the contribution that the fuels make.

There is a health impact. We don't know fully what that impact is. We don't know how serious it is. There is a health impact from lead, we know that. There is a meteorological impact from lead. We know that from testimony just the other day.

It seems to me we ought to begin to focus on this contribution to air pollution, and the best way to focus on it is to begin in this rather moderate way with the process of actually controlling the kinds of fuels that will be permitted and the kinds of additives permitted.

Would you comment on that?

Mr. RICHEY. Senator, our statement says we oppose this. I think this could be better answered by more technically oriented persons. I tend to think that limiting the fuels that go into a device is sort of on the theory of garbage in-garbage out.

What we put into an internal combustion engine may not come out the same way. It may be something considered to be unpleasant on the way in and when it comes out in the exhaust it might be different.

This is why we subscribe to the belief that the emission standards should be set rather than input standards. I would have a feeling as a businessman that if I were manufacturing a fuel for an internal combustion engine that if the quality contents of that fuel are controlled I wouldn't be doing very much about trying to improve fuel, to see what we can do to make the system operate better.

I think particularly in the combustion fuel we have to consider the whole system. You have a fuel, a device to consume it, to generate heat, power, whatever, and a device to exhaust the wastes and clean them up.

I would rather see a whole system approach, rather than just the governmental approach on what you put into it.

Senator MUSKIE. We are using your statement as a way of expressing some views at this point in the hearing. First of all, one of the frustrating things about air pollution control is that once you set these emissions free in the air there isn't much you can do about it. It isn't possible to clean up air as it is possible to clean up water.

Mr. RICHEY. That is correct.

Senator MUSKIE. So that control has to get back to the source. The real source of pollution that is emitted is the fuel. If the automobile didn't burn fuel, there would be nothing to emit.

Mr. RICHEY. This is true.

Senator MUSKIE. Up to now what we have concentrated upon is control of the automobile that does use fuel. Certainly, that is a control point that should not be ignored.

In the steel mill, we use the technology of the chimney or the precipitators that are attached to the stacks as a means of control. But we are also concerned with the composition of the fuel. Increasingly, as you know, in metropolitan areas, control agencies are controlling the kinds of fuels permitted, the sulfur content and so so.

So what is burned and consumed is the original source of the pollution from all mobile sources of pollution.

It seems to me that we have perhaps delayed too long in coming to grips with that control point.

Mr. RICHEY. In answer to that, I can cite two specific examples. For example, we are not allowed to, for reasons which don't need to be brought out here, to use diesel locomotives in coal mines. Yet, they are used in other parts of the world in coal mines.

They are able to control the ignition standards of the locomotive so that there is no hazard from carbon monoxide or pollution.

In my own company we operate an industrial supply company which has warehouses. We use gasoline-powered forklift trucks which have devices so that the exhaust from the internal combustion engine is not hazardous to the people working in there. It has been used quite successfully.

I feel the thorough approach has to be a systems approach. I think it is oversimplifying to take a garbage in-garbage out position.

In the coal business we are familiar with sulfur dioxide. Our position is that those gases should be removed by the people operating the plants. Sulfur coal has disadvantages which are not sometimes brought out. Electrostatic precipitators will not work on low sulfur coal. This, then, permits the solids to go up and defeats the purpose of the device.

I do not subscribe and I don't think the chamber should subscribe to limiting the fuel source. I agree with everything you say, that you don't have a problem unless you consume the fuel. But the fuel should be consumed and then the emission controlled.

Senator MUSKIE. It seems to me that my concept of the systems approach is an approach where you take the whole problem from beginning to end.

The beginning is the fuel and the end is the emission.

Mr. RICHEY. But it is the end product that is hurting the individual.

Senator MUSKIE. But don't you have to pay attention to its source?

Mr. RICHEY. If the emission standards are set, it follows that as you work back on the problem the fuels may have to be changed. It may be the system between the fuel and the emission that must be changed.

Senator MUSKIE. If you have absolutely no control over what goes into these furnaces or into these engines, or other technological ways of consuming fuel, if you don't control that at all and say, "You can put anything in and we will concentrate our efforts on what comes out," haven't you lost an important control?

Mr. RICHEY. I still subscribe to the theory that the thing that is polluting the air is what is coming out of the pipe.

If you set a limitation on what is coming out, from an engineering standpoint you have to walk all the way back to zero to maybe make your corrections.

I am not saying fuels won't be changed, but I am saying let us not limit them to discourage changes from being made that would be an improvement.

If a man can make a fuel and the law says, "You take out A, B, C," to correct emissions, that is the end of it.

Senator MUSKIE. But if you have a systems approach, you can control all along the line, can't you?

Mr. RICHEY. This is what I am talking about, a systems approach.

I guess we can go back and forth on this forever. You are the Senator and I am the coal miner.

Senator MUSKIE. I understand. I really didn't raise the point to belabor you on it. I thought your testimony was a useful place in the record to raise the issue which I think is going to become increasingly exposed and perhaps controversial.

We might just as well have a beginning and discuss it.

Mr. RICHEY. I hope you will consider the statements we have made. What is clouding up Euclid Avenue on a winter day is a lot of automobiles' exhausts and bus exhausts. If we can run a locomotive underground without that problem, I am sure they could run buses without that problem.

I testified in New Jersey on their air problem.

Really, the only disagreeable thing about being in our capital was that we were almost asphyxiated by buses and cars in the street. We brought this out.

Senator MUSKIE. Thank you very much, Mr. Richey.

Mr. RICHIEY. It has been very nice to be here. Thank you for allowing me the time.

Senator MUSKIE. Thank you, all. Additional statements in line with today's testimony will be included at this point.

(The following materials were received for the record:)

STATEMENT BY W. W. McCLANAHAN, JR., EXECUTIVE VICE PRESIDENT, NATIONAL COAL POLICY CONFERENCE

In just the last few years the term "ecology" has come into common usage. The people have developed a rightful concern about their environment, and at both ends of Pennsylvania Avenue responsible Government officials are seeking to meet that concern, to protect and enhance that environment.

But because further efforts may be needed does not mean we should do the wrong thing just to do "something". Let us not deceive ourselves nor the public. The rush to new legislation significantly restructuring the Air Quality Act of 1967 may give the appearance of Governmental action, but that is only an appearance, not a reality.

The Air Quality Act of 1967 provides major and effective tools to clean up the air—and many of those tools today, in 1970, are still almost new, untested, unused. There are two major reasons for this—lack of money, and lack of trained manpower, at the Federal, state, and local levels. It may sound heretical, but isn't it about time we provided adequate funds and staff to make the Air Quality Act effective, rather than drastically revising its procedures and embarking on another paper program, more ambitious in scope and more untried in concept? Certainly if recent experience has any value as a guide, and in light of announced budgetary requirements and indicated funding capabilities, the legislative proposals now pending are unrealistic in their major aspects.

We are not proposing that the objective of improved air quality either be delayed or diminished. On the contrary, we propose to accomplish this objective in the quickest, most effective, and most economical way, and in a manner most consistent with other important national needs. Nor do we oppose some changes in the Air Quality Act. What we do oppose are changes which make it difficult to achieve improved air quality in a rational, economically sound manner, and, by diverting scarce resources will delay its accomplishment.

Simply stated, the pending legislation proposals have three undesirable characteristics that override any possible benefits they may contain. First, they will divert the clearly limited resources available for air quality control from where they are most urgently needed. Second, by significantly restructuring the organizational and procedural requirements provided in the Air Quality Act, they will delay rather than speed up the necessary actions at all levels of Government, as well as in industry. Third, they will eliminate the flexibility of approach which the authors of the Air Quality Act recognized as essential in view of the state of technology and the variety of problems in different localities, as the requirements of national economy.

Central to the Administration bill is the proposal for national emission standards relating to new major stationary sources of potential pollution, and to existing stationary sources which may cause extreme hazards to health. With respect to stationary sources which pose immediate hazards to health, the present law provides prompt and effective remedies. With respect to new major stationary sources of potential pollution, two comments are pertinent, one general and one more specifically relating to the coal industry.

As a general matter, the Air Quality Act of 1967 specifically authorized a study to be made by the Department of Health, Education, and Welfare on national emission standards. That study has been going forward for two years. There is legislation pending to authorize the printing of the report which I assume is the result of that study. That report has not been made available for study by industry, nor to my knowledge by members of the Congress. It has not been testified upon by the Department of Health, Education and Welfare. Whether or not the National Coal Policy Conference would agree or disagree with that report, it

makes little sense to be going forward with pioneer legislation on this subject without first giving those interested and concerned in and out of the Congress an opportunity to study the report and to comment thereon.

On the specifics, and with particular reference to sulfur oxide emissions, unless the technology is available adequately to control or reduce sulfur oxide emissions for coal-fired power plants, it will make no difference whether the emission standards are national or local. The critical element is not the emission standard in this instance but the development of the economically and technologically feasible means of control and reduction of sulfur oxide emissions. As far back as 1963 the Congress directed that the Executive Branch take the necessary steps to develop such means of control. This was reemphasized in the Air Quality Act of 1967. The fact of the matter is that neither the funds nor the necessary effort have been expended.

This critical area is capable of resolution—but no amount of statutory words will do the job. Just as soon as technologically and economically feasible techniques exist, I have no doubt that the electric utility industry will seize upon them and utilize them in major new power plants. This will be true under existing law as surely as if there were national emission standards.

On the other side of the coin, any national emission standard, or any state emission standard for that matter, which effectively precludes the use of coal would be wholly unrealistic. In the last few weeks the Chairman of the Federal Power Commission and the Chairman of the President's Office of Science and Technology have projected major power shortages in the United States, and in particular in the Northeast, with some blackouts and brownouts likely this year. There is a shortage of power plants, and today there is a shortage of coal, as well as of other fuels. This is a result of many causes which I will discuss shortly. In any event, however, the electric energy requirements of the United States will greatly increase in the next decade. There is no question but that significantly more coal than is utilized today for the generation of electric power must and will be utilized for that purpose in the coming years—and by this I mean an increase in annual consumption of hundreds of millions of additional tons of coal by 1980.

If I can borrow a word and phrase from the young people, and talk about what is relevant, and tell it like it is, certainly as far as coal-fired electric power plants are concerned, technology and technology alone is the key to effective air pollution control and abatement.

With respect to national air quality standards, it is our view that they are the wrong approach at the wrong time. First, the Administration bill would appear to eliminate the present requirement of the development and publication of air quality criteria and other pertinent information on which standards should be based.

Second, as the existing criteria have made clear, there are many considerations in establishing an air quality standard. There is health as the primary consideration. There are economic considerations. There are aesthetic considerations. The present law provides that the Department of Health, Education, and Welfare has the right of approval on all standards, and that they must be consistent with the criteria and control technology issued. Patently, a community with older plants, for example, so long as the health requirements are met, may properly be allowed to sacrifice some of the aesthetic objectives in order to permit those plants to remain open and to provide jobs for the people in that community. On the other hand, a residential or resort area may feel that aesthetics should get considerably greater emphasis in order to enhance the quality of that area.

This important flexibility, written into the Air Quality Act of 1967, would be destroyed by national air quality standards. If they were written at the least restrictive level, with health alone being protected, they would tend to discourage further community action to protect or enhance the air for economic or aesthetic reasons. If they were written at the most restrictive level with aesthetics dominating, they would virtually destroy a great many industrial complexes and establishments contrary to the desires of the people in those communities.

The job of cleaning up the air is massive and we should neither strive to achieve, nor will we achieve, uniform results.

Senate bill S. 3546 does not have these two major shortcomings. On the other hand, it has other significant defects. It provides for a rapid expansion of the air quality control regions so that they cover all areas of the United States. Had we the money and the manpower, and the know-how to do the job of air pollution control which all of us would desire, no one could object to this con-

cept. My objection is simply that the states at this very moment lack the money and lack the manpower to do an effective job in the critical regions already designated.

Since the existing legislation already provides procedures for dealing with individual sources of pollution which pose a serious problem, even though they are outside a control region, we respectfully suggest that the procedure proposed of blanketing the entire United States with air quality control regions is neither necessary nor desirable at this time. It will not expedite air pollution control and abatement. On the contrary, it will slow it down by diverting resources that are more urgently needed at the more serious air pollution control areas.

Second, S. 3546 contains a number of procedures for enforcement which we believe are onerous, cumbersome, and unrealistic. Moreover, they concentrate action in the Department of Health, Education, and Welfare, which again is understaffed and underfunded. We believe that there will be far more effective enforcement by decentralization, with the states being encouraged and required to do their job. Also, in connection with the over-all approach to enforcement taken in S. 3546, while we respect the view that a well balanced combination of the carrot and the stick is a most effective means of encouraging and prodding, when the club is substituted for the stick, the purpose of the entire endeavor can be defeated.

There is no reason to believe that the enforcement provisions which were carefully worked out in the drafting of the Air Quality Act of 1967 will prove ineffective. They have not even been given a chance to work. Unrealistic enforcement deadlines, harassment by a multiplicity of private litigations, harsh penalties, all inevitably will result in pollution control becoming a series of battles between industry and government rather than a war by both industry and government against air pollution. To be truly effective, our air pollution control procedures must invite a cooperative endeavor by industry and government. The present law seems well designed for that purpose though there are areas in both the Federal and state level where both industry and government could do a better job of executing that purpose.

Let me turn now from the specific legislative proposals to a matter which I consider most important of all in terms of the needs of the United States, and in terms of any rational determination of Federal policy with respect to air pollution control, as applied to electric power plants. We respectfully suggest that the entire approach taken to date by government, and by industry, has been too parochial, too narrow.

If we are to meet our national responsibility for cleaning up the air, and for cleaning up the water, and for providing to the American people the low-cost, plentiful supply of electric power on which our entire economy and our great industrial progress are based, it is indispensable that the United States of America formulate a comprehensive national fuels and energy policy. The threatened power shortages, the imbalance of fuel supplies, the rising cost of fuels, and of electric power, even the dissatisfaction that progress in air and water pollution controls has not been rapid enough, are directly attributable to the failure of this nation to face up to the need for a national fuels and energy policy.

Numerous Federal, state, and local agencies are involved in formulating policies and regulating various aspects of the fuels and energy industries. Any compatibility among these varied policies and regulations emanating from the numerous agencies involved is happenstance rather than the result of careful planning.

Permit me to summarize the various and varied sources of policy and regulation which bear on this matter. The electric utility industry is subject to regulation by state commissions and by the Federal Power Commission. It is also directly affected by the Atomic Energy Commission, to the extent that nuclear power plants are involved. The natural gas industry is regulated by the Federal Power Commission.

Air pollution control is within the jurisdiction of the Department of Health, Education, and Welfare, and state and local agencies. Water pollution control is within the jurisdiction of the Department of the Interior and state and local agencies. Radiation and thermal pollution problems are within the jurisdiction of the Atomic Energy Commission and possibly state agencies.

Nuclear research is controlled by the Atomic Energy Commission. Coal research is within the jurisdiction of the Department of the Interior, but is also under the jurisdiction, as it relates to air pollution, of the Department of Health, Education, and Welfare.

Oil imports, which of course include the question of imported low-sulfur fuel oil, are subject to the jurisdiction of the Department of the Interior, as delegated by the President. They also are subject to the Office of Emergency Preparedness. Gas imports from Canada are subject to the control of other agencies of governments. Tax policy as it affects production of oil, gas, or coal, or the installation of pollution control devices, resides in the Treasury Department, and in various state agencies.

In addition, we have a new committee on air pollution in the Department of Commerce, we have the President's Environmental Council, the President's Office of Science and Technology, etc. We have new laws on mine safety which will directly affect fuel costs and availability, administered by the Labor Department.

If we are going to have the energy we need at reasonable cost to the American public, and at the same time clean up the air and the water, it is obvious that the policies and regulations formulated by all these different groups must have some real coordination.

Moreover, the allocation of funds and resources by government must bear far greater relationship to our energy needs and to our pollution control requirements than has been the case to date. One striking example of gross disparity in this regard is the annual multibillion dollar allocation of Federal resources to assist the nuclear power industry as compared with the insignificant allocation of funds for either coal research or pollution control research. In this connection may I respectfully point out that had but a small part of the funds expended by the Federal government for the development and promotion of nuclear power been expended for research and development in air pollution control with respect to conventional fuels sources, we would have long since resolved the air pollution problems as they relate to coal fired electric power plants.

Further, it makes no sense for a state or Federal agency to decide that air pollution control will be resolved by building nuclear power plants instead of conventional power plants, if, as is now clearly the case, sufficient problems have developed with respect to nuclear power plants, so that the already committed plants are now years behind schedule, and even if they were on schedule they would only fill a comparatively small part of our growing energy needs. It makes no sense to talk about substituting natural gas for coal or oil when in fact our reserves of natural gas are wholly inadequate, the price of natural gas has risen sharply, and it is clear that natural gas can do but a small part of the job.

What we must do is take the broad look and determine (1) what our energy needs will be in the decades ahead; (2) where we have the greatest potential in terms of energy resources for meeting those needs; and (3) what technological and other problems must be overcome so that we can deliver this energy at a low-cost and consistent rate with our need to clean up and protect the environment.

What I am saying is not defeatist about their meeting our energy demands or resolving our pollution problems. For example, I am extremely optimistic about the future of coal in America. It is America's most plentiful low-cost fuel. It is located throughout the United States. Every farsighted person knows that one day coal will be a significant source of oil and gasoline and gas, as well as continuing to be a major fuel for electric power plants. But our economy will pay a frightful cost and we will be subject to great disappointments in the area of pollution control unless we make a comprehensive review of our national fuel and energy needs, and gear our policies, our regulations, and our programs so that they are designed to meet those needs as well as our other important national objectives.

Thus, I would propose a very specific program today which I believe would do far more to clean up the air, and do so for less money in the long run, and probably in the short run, than the legislation now being considered. Moreover, the program I propose also will take the very important steps, not included in any of the proposed legislation, of assuring that this nation fills its energy requirements as well as its environmental requirements.

First, I would establish a National Commission on Fuels and Energy Policy. This Commission should be required to report back within one year with respect to the following:

(a) The nation's energy needs; with particular reference to electric power plants for the next ten years;

(b) The fuel resources available to meet those needs, including a program of research and development to make realities of such major technological advances as magnetohydrodynamics which will greatly enhance our supply and ability efficiently to use our fuels resources;

(c) The air and water pollution problems which these expanded power refinements will generate, including the technological problems which must be overcome if those pollution problems are to be resolved, and a program to overcome those problems promptly and efficiently; and

(d) The compatibility of other major Federal and state policies and programs with the objectives of both meeting the energy needs and resolving the pollution aspects of those needs, including recommendations for change, where change is required.

Second, I would immediately fund and direct that the research and development immediately required with respect to such matters as sulfur oxides and particulate pollution, and possibly now also with respect to the new criteria just issued for nitrous oxides to establish on a greatly accelerated basis commercially feasible methods of pollution control.

Third, with these two programs underway, I would go forward under the existing Air Quality Act, where considerable progress has already been made.

At the beginning I pointed out that the nation's resources in money and men in this area are still far too scarce. There is immediate need for funding the training of additional personnel; there is need for funding better instrumentation for measuring emissions and air quality; and there is need for funding more research in the basic cause-effect questions relating to air pollution and health and safety.

There is also an immediate need for recognition that under the Air Quality Act, or any revision thereof, cognizance be taken of the fact that our fuels and energy economy already has been thrown into considerable imbalance and uncertainty by the many conflicting policies, or in some instances the lack of policies, which now exist. It is imperative that timetables for controls be established which, subject to immediate health needs, also are consistent with energy and pollution control requirements for the next decade. In other words, hasty, unrealistic solutions today may adversely affect both energy and pollution control requirements of tomorrow.

With these steps, and the experience of one more year under the Air Quality Act of 1967, this Congress will be in a far better position to assess the past, predict the future, and revise our air pollution control and other related laws.

If we take these steps, I respectfully submit that within the next two or three years we will have made dramatic progress toward bettering our environment and at the same time assuring that our national economy and our national security are protected by a rapidly expanding, low-cost electric energy base.

STATEMENT BY KAREL A. WEITS, PRESIDENT, INDUSTRIAL GAS CLEANING INSTITUTE, INC.

Mr. Chairman, members of the Subcommittee, I, as President of the Industrial Gas Cleaning Institute, Inc., a national association of manufacturers of air pollution control equipment, have written this Statement with the hopes that it will be included in the record of the public hearings which have been held by this Subcommittee on the pending Clean Air legislation.

When this Institute testified before the U.S. Senate Subcommittee on Air and Water Pollution on May 18, 1967 at the hearings on the Air Quality Act, we stated that:

1. We recognize that there is an air pollution problem in the United States that has become critical in many areas;

2. We recognize that the solution must come from cooperative efforts of industry and the general public with Federal, state and local governments;

3. We recognize our industry's obligation to aid in the solution of this problem;

4. We believe our industry has the necessary skills and facilities to develop equipment to meet many unsolved problems once they are defined as problems, and that such problems will satisfactorily be solved in the fastest manner possible if done on a completely competitive basis;

5. We firmly believe that air quality criteria should be developed as a prerequisite to the establishment of emission standards;

6. We strongly believe that control ordinances should be passed only after thorough study to insure that the desired ends will be obtained;

7. We believe more in incentives than penalties to obtain compliance with air pollution regulations because we feel that unjust burdens should be avoided, if at all possible, commensurate with good air quality; and

8. We firmly believe that additional research is needed to develop better methods for the accurate, quantitative measurement of air pollutant sources and effects.

As the result of developments in air pollution control since then, we have modified our position in one area. We now believe that the Federal government should set Federal ambient air standards and Federal emission standards on a regional basis as quickly as possible.

The Air Quality Act of 1967 provides for the development of air pollution control regulations through a process known as "air resource management". This process consists of:

The development of air quality criteria.

The establishment of ambient air quality standards, and

The establishment of emission standards.

Air resource management appears to be a logical, orderly and scientific approach to air pollution control. However, in carrying out the air resource management procedure, some weaknesses in the "logic" and "science" of these methods have become apparent. Some of them are:

1. Interpretations of air quality criteria have been oversimplified and have led to many erroneous conclusions and debates.

2. At various public hearings throughout the United States, the public has indicated that it wants the air to be as clean as possible, in some instances approaching "zero" emissions, and done in the shortest possible time. It should be pointed out that such an approach is not consistent with the air resource management concept.

3. Because ambient standards are approaching background levels, emission standards are approaching zero.

4. Various techniques are being employed to develop emission standards from ambient air quality standards. The most often used technique is to obtain emission inventory information and calculate (by diffusion modeling) what rollback would be necessary to achieve the desired standards. There are many inaccuracies in this technique, including the reliability of emission inventory information and the accuracy of diffusion modeling formulae. There are also many questions with respect to the significance of annual and other relatively long-term means with regard to air pollution problems. Most of the modeling techniques employ mean concentrations.

All of these problems are leading to a good deal of subjective input in developing emission standards. The states are approaching this problem in many different ways, and it appears that there will be many different types of emission standards adopted. There is no requirement that the states adopt uniform or consistent regulations.

Unless some corrective action is soon initiated, it appears that nationally we will be faced with a chaotic situation with a hodgepodge of unrelated regulations. Such a situation renders the task of industry and the suppliers of control equipment far more difficult than necessary if not impossible. It appears that present programs not only have built-in delays, but are leading to cumbersome, confused and possibly impractical regulations.

We believe that the best air pollution controls will only be attained when firm, definite and lasting requirements are established with which polluters can endeavor to comply without the fear that the regulations will soon be altered, thus making the control systems inadequate just before or shortly after their installation. The user will then know what is required and have no reason not to comply. It is interesting to note that an article in the *Business Week Letter* of March 2, 1970, reported that some management consultants are advising their clients to put off the purchase of control equipment because the Federal state and local governments haven't decided as yet what the rules will be. The most effective regulation can best be established by one overriding authority which expeditiously establishes standards that will remain unchanged for a specific period and cannot be superseded by other authorities. We feel that this authority should be the Federal government for the reasons explained previously. We recognize the attendant legal and legislative problems and the vital issue of States rights that are involved, and our recommendation is made with-

out regard for political philosophies or practicalities which may render it impotent. However, considering only the best air pollution control procedure, it is our opinion that it can best be attained by:

1. Having adequate standards set by one authority and not permitting other authorities to supercede them, and

2. Having such standards remain in effect long enough for industry to comply with them without rendering the equipment obsolete before it is operational.

When installing control equipment in many existing plants, it can often take from two to three years from the time of the original concept to operation. New plants can require from three to four years. Under present conditions, air pollution control requirements can change two or three times in that period. In retrospect, would we not have been further ahead today, and wouldn't the public have had cleaner and healthier air during the intervening years, if in 1963, definite standards on particulate emissions had been set, giving industry three years to comply and keeping the standards unchanged until 1970? The arguments against such a procedure are that it obviates the possibility of better control through improved techniques, and overlooks the possible increased pollutions in a given area which would reduce the air quality standards below the acceptable limits.

Such arguments are valid, if true. We must, however, take a realistic look at the possibility of a scientific breakthrough and at the same time examine what has been developed since 1963. How long will the present, economically feasible methods of air pollution control remain as the principle means of control? We believe, long enough to hold standards static so as to permit industry to comply. In addition, air quality standards can be set so as to eliminate the fear of deterioration below acceptable limits. We feel that this can only be done by the Federal government, and we therefore recommend the establishment of Federal standards.

You will note that I have used the term *Federal* emission standards instead of *national* emission standards. The word "national" has an inherent implication that the standard must be uniform for all areas of the country. We believe, and the Air Quality Act was based on this principle, that different areas have different geographical and atmospheric conditions, plus different concentrations of industry and population. Their needs are, therefore, different. Since a good deal of work has gone into the regional concept and the principles remain valid, there is no point in negating that effort. *Federal* standards only imply that they are set by the Federal government. They could, therefore, be established on a regional basis and conform with the programs established under the existing Air Quality Act.

In opposition to regional standards, it is argued that it is unfair to require similar industries to install more costly controls in one area than in another; and further, that less stringent controls would invite an influx of industry into such areas, thereby increasing pollution above acceptable limits. In rebuttal to these arguments, we must remember there are many inequities throughout the country; such as, labor rates, freight rates, taxes, etc. Air pollution control is a factor to be considered in locating a new plant, but it is only one of many. We do not believe that air pollution controls in and by themselves would ever cause an influx of industry into any given area. We see no reason to change from the regional basis or any inequities resulting from this concept.

As previously stated, we favor incentives rather than penalties to encourage good control. We, therefore, do not wholly agree with the provision for a \$10,000 or more per day fine which we consider punitive to the point of being destructive. Our disagreement is more one of degree than of principle because we recognize that in some cases a fine is a form of incentive and may be necessary. We do not believe that it is the Government's intent to destroy industry, but in many cases a fine of that magnitude could do just that.

As in all things, the cost of pollution control will ultimately be paid by the American public either in the form of higher taxes, higher prices or lower dividends. The question is, how fast and how equitably can the burden be transferred. Immediate transfer through government financing is wholly unacceptable. On the other hand, many companies could find the total costs prohibitive and thus be forced out of business. Here the immediate sharing of part of the burden may be wise and justified. The best and most equitable way to share this burden is through tax relief. Since some sort of fine may be necessary for non-compliance, isn't a bonus in the form of a tax credit equally justified? We, therefore, suggest that consideration be given to allowing tax credits on all control systems that exceed the standard. We readily admit that such a plan

would be difficult to administer, and consideration would have to be given to many facets of pollution control; such as, plants that switch to more expensive fuels to reduce particulate and SO₂ emissions. Under this plan, emission standards could not be set so high as to be unattainable or insurpassable. Such standards would not work in any event. The tax credit would have to increase exponentially since the difficulty of surpassing a standard increases similarly.

We believe that the procedure instituted by the State of New Jersey whereby a large percentage of the fine is placed in escrow and returned to the polluter if he rectifies the condition satisfactorily within a specified time, is well worthy of consideration and should be provided for in the law.

In summary, we wish to reemphasize some of the points presented in our earlier testimony:

1. There is equipment available today that can reduce particulate emissions from industrial sources to the currently acceptable limits. There is no necessity to delay control of particulates due to lack of equipment. There is no necessity for government research in this area since industry has and will continue to perform whatever research is necessary. A competitive economy is still the best means of solving the problem.

2. In regard to gaseous pollutants, now that some of the problems in this area have been defined, industry will produce the necessary equipment faster and more efficiently than it can be produced any other way.

3. We recommend and urge the early establishment of *Federal* emission standards on a regional basis, and that these standards remain in effect for a specified period of time which is long enough for industry to comply with the standards and then utilize the equipment once it is installed.

4. We urge caution and judicial assessment of fines, and the enactment of some compensating form of incentives.

5. We strongly urge that additional research be undertaken to develop a better method for the accurate, quantitative measurement of air pollution at the source; and finally,

6. We believe there should be increased efforts to develop more uses for as well as some economical means for disposing of the rapidly increasing quantities of waste materials being collected.

A STATEMENT SUBMITTED BY EDISON ELECTRIC INSTITUTE, NEW YORK, ON PROPOSED AMENDMENTS TO THE CLEAN AIR ACT

The electric utility industry has been concerned with air quality since its earliest days. One of the continuing reasons for substituting electric energy for some other energy form for such uses as lighting, stationary motors, space heating, and transportation has been the cleanliness of electricity. Balanced against this cleanliness at the point of use must be the impact of the combustion process involved in converting coal, gas or oil to electric energy. Nationally, only a small proportion of the total of air pollutants in this country is attributable to fuel-burning power plants, although over half of the nation's coal is used for power generation. Electric utilities are working in many ways to reduce this proportion to a minimum.

For decades, no industry has practiced more careful control over its fuel-burning operations than the electric utility industry. Improved combustion processes, changes in stack design, use of low-sulfur fuels, development of techniques to eliminate special emission problems, and continuing research and development have all been part of the continuing industry effort.

The most recent survey of electric utility expenditures on air quality control shows that 125 companies spent a total of about \$193 million for this purpose in 1968—over 50 percent more than similar expenditures in 1967. It is estimated that the entire electric utility industry has spent more than one billion dollars over the years on air pollution control facilities.

In 1967 there was considerable discussion in the Congress and the nation over the desirability of uniform, national ambient air quality standards and national emission standards. Edison Electric Institute expressed its concern over national emission standards at that time and presented testimony before Congress stating that view. We continue to believe that the most effective way to achieve desired air quality throughout the nation is to have regional or air basin emission standards which reflect differences in weather conditions, topography, pollution sources, hours of operation, operating conditions, stack heights, and other

variables. The effect of uniform national standards with respect to emissions from classes or types of stationary sources could be to impose unnecessary restrictions on the use of coal and other fuels in the thermal electric generating facilities. Sound development and utilization of the nation's fuel resources could be disrupted. Nuclear and fossil fuels are close competitors in many areas of the country, and this competition works in the interests of consumers of electricity by holding down plant and fuel costs. It would not be in the national interest for a particular fuel to be priced or regulated out of possible use by steam electric generating units because of a requirement to install unnecessary emission control devices.

It appears to us that the Bill now under consideration is not intended to apply to radioactive emissions from nuclear generating units. Certainly these emissions currently are adequately regulated by the Atomic Energy Commission. It may be that appropriate language in the Bill would clarify any question which might arise on this point.

We believe that any pollution source—stationary or mobile, new or old—which is extremely hazardous to health should be acted against promptly. The Secretary of Health, Education and Welfare can now act effectively against such pollution where it originates in one state and affects another state, or where there is presented an imminent and substantial danger to the health of persons, and state authorities refuse to act.

We would support national minimal ambient air standards, if Congress concludes they are necessary. With respect to emission standards, however, the Clean Air Act was based on the concept that this is essentially a local state or regional matter. We believe the present approach to emission control is sound and should be given the opportunity to succeed before a new statutory program is enacted.

(The letter and telegrams reprinted below were received by Senator Muskie for the record:)

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE.

PUBLIC HEALTH SERVICE,

ENVIRONMENTAL HEALTH SERVICE,

Arlington, Va., February 16, 1970.

HON. EDMUND S. MUSKIE,
Chairman, Subcommittee on Air and Water Pollution,
U.S. Senate, Washington, D.C.

DEAR SENATOR MUSKIE: In response to your letter of January 13, 1970, we, too, received a telegram from William B. LeMaster on December 17 protesting industry domination of the air quality standards public hearings in Cincinnati; and we received copies of the letters from Mrs. Richard Smith to Governor Rhodes and Dr. Arnold complaining about the lack of consideration given to citizen spokesmen at the same hearings.

On December 18 we telegraphed Dr. Arnold requesting information on procedures followed to insure that citizen participation had been facilitated in accordance with the intent of the Clean Air Act, and on December 19 we received a telegram from Dr. Arnold in which he said, among other things, that the Ohio Board would hold another public hearing for the Ohio portion of the Cincinnati Air Quality Control Region.

Copies of our telegram to Dr. Arnold and his reply are enclosed. If you wish any further information, we will be pleased to furnish it.

Sincerely yours,

JOHN T. MIDDLETON, *Commissioner.*

Enclosures.

CINCINNATI, OHIO, December 17, 1969.

DR. JOHN MIDDLETON,
Commissioner, National Air Pollution Control Administration,
Arlington, Va.

In behalf of 16,800 members of the United Auto Workers Union of the Cincinnati area as well as hundreds of other greater Cincinnati citizens I protest the industry domination of the Greater Cincinnati Metropolitan Air Quality Control hearings of this date as has been permitted by the unfair procedure adopted and administered by Dr. Emmett Arnold, Ohio Air Control hearing officer in behalf of all those who have waited six hours without the opportunity to testify and in behalf of many citizen hearings such as was intended and prescribed by

the Air Quality Act of 1967 be reconvened with adequate notice and ample opportunity for full citizen participation.

William B. LeMaster, Cincinnati, Ohio, Director Education, Region 2-A UAW Concurred in by Elam Lantz, Basin Ministry, Richard Sears, Director of Education and Research Ohio AFL-CIO, Ralph E. Yodaiken, M.D., Citizen for Clean Air, David Workum, Citizen of Cincinnati, Prof. Frank Etges, Citizen of Cincinnati, Charles T. Sweeney, Ohio TB & Health Association, Don C. Westfall, Ohio Council of Churches, Mary S. Wright, Isaac Walton League.

Dr. EMMETT ARNOLD,
State Health Commissioner,
Ohio State Health Department,
Columbus, Ohio.

Have received wired protest from UAW, AFL-CIO, Council of Churches, Isaac Walton League, TB Association and other organizations on hearing you conducted yesterday in Cincinnati. Would appreciate information on what procedures were followed to ensure that this was a public hearing in which opportunity for citizen participation was facilitated in accordance with the intent of Clean Air Act.

JOHN T. MIDDLETON, *Commissioner.*

COLUMBUS, OHIO, December 19, 1969.

JOHN T. MIDDLETON,
Commissioner, National Air Pollution Control Administration, U.S. Public Health Service, Department of Health, Education, and Welfare, Arlington, Va.

I have today issued the following news release which I believe is a complete response to your telegram of December 18 requesting information with regard to procedures followed at the public hearing conducted in Cincinnati on December 17:

Public hearings of the Ohio Air Pollution Control Board are wide open and any person so desiring can have a statement placed in the record of the board, according to Dr. E. W. Arnold, State health director, who serves as the board's chairman.

Dr. Arnold made this clear in answer to critics of an air pollution board public hearing in Cincinnati Thursday. The hearing was held as part of an interstate and Federal program for establishing air quality standards in the Cincinnati area.

"We opened that hearing at 9 a.m." Dr. Arnold said. With only a short break for lunch, we continued the hearing until 7:30 p.m. We did not adjourn the hearing until it was determined by repeated questions that there was nobody present still waiting to be heard.

"We also announced that the board would accept written statements for the record, and that this opportunity would be open for another week."

Dr. Arnold said the board heard a total of 94 witnesses, representing agencies, organizations; industries, units of government, and those speaking as individuals.

"The board is interested in gathering both technical information and general expressions of opinion," Dr. Arnold said. "From all of this testimony the board will be guided in drafting proposed regulations."

Dr. Arnold explained that the board will hold another public hearing before final addition of regulations for air quality standards and emission controls.

Critics complained that some persons desiring to appear as witnesses were unable to wait for an opportunity to be heard.

"Unfortunately we cannot hear everybody at once," Dr. Arnold said. "We announced the agenda for witnesses at the start. It is the same pattern that has been used at public hearings of the Ohio Water Pollution Control Board on water quality standards, with great success and without complaint."

"Some intended witnesses change their minds about offering testimony after they hear somebody else make a presentation with the same information they had intended to offer."

"Others decided to leave written statements for the record instead of reading them aloud during the hearing. I can give assurance that all testimony, written or oral, is thoroughly reviewed by board members before decisions are made."

Dr. Arnold said specific criticism of the hearings had come from representatives of agencies which had actually been heard at the hearing.

"Nobody was denied an opportunity to be heard during the meeting if that was what they wished," Dr. Arnold said. "In addition they had the opportunity of submitting lengthy written testimony—and no limit was put on the length."

Dr. Arnold said all persons desiring to be heard submitted signed cards.

"We are writing letters to those who submitted such cards and then did not come forward to testify when they were called," he said. "We will ask them once again if they want to submit a written statement before the record of the hearing is closed."

E. W. ARNOLD, M.D.,
*Director, Ohio Department of Health,
 Chairman, Air Pollution Control Building.*

CINCINNATI, OHIO, *December 16, 1969.*

JOHN T. MIDDLETON,
*Commissioner, National Air Pollution Control Administration,
 Arlington, Va.*

In all fairness concerning Cincinnati hearing suggest you contact Chairman Tristate Air Committee, Mrs. Willard Pistler, Jr., phone 513 821-7907, address 1292 Sweetwater Drive.

HELEN C. BLACK.

Senator MUSKIE. We will recess until 9:30 tomorrow morning.

(Whereupon, at 11:45 a.m. the subcommittee recessed, to reconvene at 9:30 a.m., Friday, March 20, 1970.)

AIR POLLUTION—1970

FRIDAY, MARCH 20, 1970

UNITED STATES SENATE,
SUBCOMMITTEE ON AIR AND WATER POLLUTION
OF THE COMMITTEE ON PUBLIC WORKS,
Washington, D.C.

The subcommittee met at 9:30 a.m., pursuant to recess, in room 4200, New Senate Office Building, Hon. Thomas F. Eagleton (member of the subcommittee) presiding.

Present: Senators Eagleton, Cooper, Boggs, and Baker.

Also present: Richard B. Royce, chief clerk and staff director; Bailey Guard, assistant chief clerk, minority; Thomas C. Jorling, minority counsel; Leon G. Billings and Richard D. Grundy, professional staff members, and Adrien Waller, staff member.

Senator EAGLETON. Good morning, ladies and gentlemen.

The Subcommittee on Air and Water Pollution of the Senate Committee on Public Works is once again in session to take testimony on S. 3546, S. 3466, and S. 3229.

At this time, I would like to yield to Senator Boggs, of Delaware, to introduce our first witness.

Senator Boggs. Thank you, Mr. Chairman.

It is a great honor and privilege for me to join the committee and our distinguished chairman in welcoming Dr. Samuel Lenher, a Vice President and Director of the Du Pont Company. Dr. Lenher has long been a leader in the field of pollution control and is one of the industry's most eloquent advocates of effective pollution abatement.

Three years ago, Dr. Lenher was a valued member of the Task Force on Environmental Health and Related Problems established by the Department of Health, Education, and Welfare.

This Task Force produced, as its findings, the volume "A Strategy for a Livable Environment".

That publication has served the Nation well in achieving an understanding of the challenges we face in seeking to enhance the quality of our environment.

It is an honor and pleasure to have Dr. Lenher appear before the committee this morning.

We welcome you.

STATEMENT OF SAMUEL LENHER, EXECUTIVE VICE PRESIDENT AND DIRECTOR, E. I. DU PONT DE NEMOURS & CO.; ACCOMPANIED BY DR. DONALD R. DIGGS, TECHNICAL DIRECTOR, PETROLEUM CHEMICAL DIVISION; AND DR. G. J. STOPPS, ASSISTANT DIRECTOR, HASKELL LABORATORY OF TOXICOLOGY

Senator EAGLETON. Mr. Lenher, please come forward.

I, too, wish to extend to you a word of welcome.

At this point in the record, I will place a brief background statement of Mr. Lenher.

(The statement referred to follows:)

BIOGRAPHY OF SAMUEL LENHER

A director, vice president, and member of the Executive Committee of the Du Pont Company. Chairman of Du Pont's Environmental Control Committee.

Appointed to Summer Study on Space Applications, National Academy of Sciences for NASA, and the Task Force on Space for President Nixon, 1968.

Member, Patent Advisory Committee to the U.S. Patent Office, 1965 to 1968.

Member, Task Force on Environmental Health and Related Problems, Department of Health, Education, and Welfare, 1966-1967.

Appointed to Research Management Advisory Panel for the Committee on Science and Astronautics, U.S. House of Representatives, 1964.

Appointed to Advisory Committee for Public Health Service Personnel Study, HEW, 1961.

Member, General Technical Advisory Committee, Office of Coal Research, Interior Department, 1960 to 1966.

Member, Secretary's Consultants on Medical Research and Education, HEW, 1957 and 1958.

Member of the corporation and trustee of Marine Biological Laboratory, Woods Hole.

Vice president, Wistar Institute of Anatomy and Biology, Philadelphia.

Member, American Association for the Advancement of Science.

Member, Society of Chemical Industry; chairman of American Section for 1964-1965.

Mr. LENHER. Thank you, gentlemen, for your cordial welcome.

Mr. Chairman and members of the subcommittee:

I appreciate the opportunity to be here this morning in response to your invitation to comment on the bills under consideration.

The Du Pont Company's history of concern for the environment led to an invitation to me to serve on Secretary Gardner's Task Force that produced a report entitled "A Strategy for a Livable Environment", which was submitted to the Secretary of Health, Education, and Welfare in June 1967.

The concern for the quality of life expressed by our committee remains with me and I hope my comments today are of some help to your subcommittee in your deliberations.

Before offering my views in particular on the proposed legislation, I do have some thoughts that generally relate to the subject before you.

The first of these are the adverse effects of the ever-increasing proliferation of laws seeking to control the environment.

The multiplicity of repetitive and overlapping statutes and regulatory efforts is inhibiting the achievement of the goal of all of us—namely, clean air.

Presently, over 25 Federal agencies are involved in environmental efforts of some type. In many States, separate agencies control water, air and solid waste management.

In addition, local governments have their versions of control and often are at odds with the State government.

Presently, this Congress has before it more than 150 bills concerning the environment, and 700 measures on the same subjects are being considered by the State Legislatures throughout the Nation.

I urge that this Congress give the question of coordination of control efforts the highest priority and provide the Nation with improved guidelines that relate to a national policy so that we may organize our economic and technical efforts in the most effective way possible.

I find it surprising that with all of the Federal laws we have on the books, we are without a definition of pollution. In a similar vein, there is a failure to distinguish between the esthetics of pollution and the seriousness of those activities which adversely affect man, animal and plant life.

My experience leads me to conclude that industry is willing and able to do the job of controlling its pollution of our atmosphere. But to achieve substantial improvement in the environment over the shortest period of time, the Federal Government must provide leadership through a unified environmental program.

Emission control efforts adequate to guarantee a quality life for all should be developed by the Federal Government and enforced by State and local agencies.

The States should be provided the power to enforce standards by licensing, and permit authority and injunctive provisions should be available to use against violators.

Criminal sanctions should extend only to those cases where there has been a willful violation of the law and regulations.

Criminal action without willfulness creates a legal barrier between the citizen or the corporation and the control official.

Turning now to the more specific provisions in the bills, we endorse the concept of national ambient air quality standards proposed in Section 107 of S. 3466.

The provisions of the existing law, which allows each State within a designated control region to establish its own ambient air quality standards, have resulted in a loss of support for local officials by the general public.

Admittedly, the result was unexpected, but upon review I can only conclude that the present law which gives the Federal Government authority with little responsibility for the outcome is not going to serve the Nation's environmental control needs.

The resulting polarization between State control officials, who have the responsibility to establish standards consistent with Federal criteria, and members of the public who have become emotional over the issue of health effects, has not been conducive to effective and constructive pollution control programs. The health effects of air pollution do not change from region to region, but are nation-wide.

Presently, the law requires that the Federal Government provide criteria for the various pollutants and the standard-setting function is left to the States.

I feel that it would be more expedient and have a greater impact on air pollution if these standards were federally established.

IMPLEMENTATION PLAN AND EMISSION REQUIREMENTS

Another area where consideration should be given to providing the Federal Government with a stronger, more unifying role is in the establishment of implementation plans and emission requirements to assure that ambient air quality standards are met.

Both S. 3546 and S. 3466 would place more specific restrictions on the States in developing implementation plans and emission requirements which, in turn, are subject to the approval of the Secretary of HEW.

I would like to suggest that the Federal Government go even further in this regard and that the Secretary be provided with the authority and responsibility to develop and promulgate a basic implementation plan, including emission requirements related to ambient air quality, to be applicable throughout the Nation.

Such a national implementation plan approach would have the following features:

1. The statute granting authority to the Secretary to promulgate the plan should express a clear national policy of priorities as guidance to the Secretary.

This legislatively defined policy should provide: first, for the protection of human health by giving primary attention to those problems and geographic areas where environmental conditions already represent a health hazard; second, for protecting the public by directing control efforts to those problems where serious health hazards will arise unless corrective action is taken soon; and third, for protecting against specific threats to the public welfare, such as damage to crops and animals.

2. The national implementation plan, including emission requirements, should be developed and, if need be, amended from time to time by the Secretary of HEW subject to statutorily required procedures to insure full opportunity for all interested parties to be heard.

3. Emission requirements should be scientifically and specifically related to ambient air quality in the development and enforcement of the national implementation plan.

This relationship of emissions to the air quality standards is basic. We in industry feel confident that we can relate emissions to air quality in almost every instance.

If we know the maximum level that is acceptable or will be allowed, we can define the allowable emission. The approach is applicable to essentially all areas of the country.

For instance, in urban areas where pollutant background levels take a part of the level allowed by the air quality standard, we can design so that our emission will not exceed the remaining portion of the standard.

This concept is now used in Europe and has the advantage of tending to discourage industrial expansion in areas with air pollution.

Through this approach, the pounds per hour limitations will vary from place to place and result in the most economical path to clean air as soon as possible based on the previously established ambient air standards.

An example of the kind of regulation I recommend was discussed by Dr. John Middleton of NAPCA in the hearings held in 1967 be-

fore the Subcommittee on Air and Water Pollution, Senate Public Works Committee on the Air Quality Act of 1967, Part IV, page 2525.

If air quality standards are just being met or if they are exceeded, industry could not increase emissions. This approach to control is generally applicable and need not be modified for specific areas.

It could be best developed by the Federal Government for application by State and local control agencies.

I wish to make it clear that the kind of national emission standard of which I speak takes into account different conditions that exist in the various geographical areas of the United States. Such regulations can be developed with the help of computers and specifically factor into the emission limitations existing local pollution background data, the low level emissions from residential and commercial sources, wind conditions, and local topography.

I have suggested that the basic implementation plan and emission requirements be promulgated at the Federal level for application nation-wide for a number of reasons.

First, it insures that a basic national policy against air pollution, based on the above priorities, will be established across the Nation.

Economic and human resources for pollution control should not be dissipated in areas of relatively mild pollution, while areas with more serious pollution problems go wanting.

Second, since the same basic ground rules for industrial control would apply nation-wide, no State could seek to attract industrial polluters at a risk to the health of its citizens.

Third, strong national guidance in setting emission requirements would discourage pyramiding of differing regulations to a single source, thus stabilizing the basis for design of control equipment. Lack of definitive control requirements can delay the solution of problems and application of available technology.

As an example, I might cite the case of a coal-burning powerhouse that is causing a local dust problem.

Installation of electrostatic precipitators would correct the problem but lack of information on allowable sulfur dioxide emissions delays the economic decision as to whether to convert to natural gas or oil or to remain on coal.

Conversion to gas or oil would obviate the need for the precipitators and the correction of the dust problem is thus postponed until the regulation on sulfur dioxide is clarified.

Specific requirements under a national implementation plan which places primary emphasis on the meeting of air quality goals for contaminants such as sulfur dioxide and dust would allow industry to aggressively move to the solution of such problems in the most economic fashion.

Fourth, the development of the national implementation plan and emission requirements would receive the attention of top national experts in government, education, the public and industry.

Fifth, centralized authority can react faster and more effectively to new knowledge of effects of pollutants or control technology, or to changes in national policy.

Sixth, the elimination of much duplication of standard-setting effort among the States would provide more time and resources for the States to pursue abatement and enforcement activities.

Section 5 of S. 3466 relates to the regulation and registration of fuel and fuel additives. Rather than take your time and analyze these sections on a line-by-line basis, I would like to offer my comments in general and, of course, would be willing to try to answer any questions that might arise as a result of brevity.

It is important that all concerned with policy determinations relating to how we go about abating pollution recognize that we will need a superb performance by every segment of the Nation that is involved in attempting to improve the environment.

More and more we are accepting the fact that this Nation's advanced industrial technology and the demands of its people for a high standard of living have caused our environment to reach the level of degradation that now exists.

Our most important weapon to eliminate pollution at the lowest cost on the most scientifically sound basis is industrial technology.

A Federal fiat eliminating technical alternatives to the solution of problems should be most carefully scrutinized before final Congressional action is taken.

As this subcommittee knows, automotive emissions constitute a major segment of pollution in certain areas of the country and drastic reductions are being made and further reductions are planned for the years immediately ahead of us.

By controlling tail pipe emissions, all industries involved are able to continue to seek the best technical solutions to reach those emission standards.

The record shows that the automobile companies and oil companies are designing the vehicles and planning for the fuels to meet the standards that have already been set by the Secretary.

I believe that there is not sufficient evidence to show that proposals to control fuel composition are necessary.

I further believe that there is no reason for the Secretary to prohibit the use and sale of fuel additives.

One of the targets of these proposals appears to be lead in gasoline. It is the position of the Du Pont Company, a long-time major producer of lead anti-knock compounds, that these products, which have allowed the public to operate their motor vehicles at the lowest cost on the needed octane rating for cars involved, should not be eliminated if the technology we see available to control automobile emissions is applied.

For the past 10 years, Du Pont has been engaged in major research programs on fuels, engines, and exhaust emissions.

From this work, we conclude that the gasoline-powered internal combustion engine offers the best potential for the low-emission vehicle of the future.

We have developed control systems for such vehicles which will meet the 1975 exhaust emission standards; this can be accomplished without changes in present fuel composition and, specifically, without restrictions on the use of lead anti-knocks.

The principal part of this system is the exhaust manifold thermal reactor. It has shown itself capable of reducing hydrocarbons and carbon monoxide to very low levels, and to do this for the normal lifetime of the car without attention, maintenance, or additional cost from annual service or replacement to the consumer.

Therefore, we believe the public can have the best of both—namely, clean air and economical gasoline at octane ratings appropriate for the past, present, and future engines.

Incidentally, we have one of our cars parked outside that is fully equipped and instrumented to show emission performance that will meet the above standards for hydrocarbons and carbon monoxide. We would be delighted to have each of you examine the vehicle and drive it if you desire.

We do know that there are 85 million cars on the road today that operate on fuel containing lead and that this is the most economical way to reach the octane levels required.

Before authority is given to rule the product off the market, consideration should be given to industrial technology presently available to control automobile emissions.

The public's desire to see improvement in the environment could very well lead to precipitous action that is not in their interest.

Selecting approaches that are less than the best available can limit our achievements and result in unnecessary costs to the consumer.

Of even greater concern is the possible effects of hastily removing lead from gasoline. Existing engines require high octane fuel that comes from the addition of a small quantity of lead to each gallon of gasoline.

With lead removed, the octane rating falls and aromatics must be added to restore the gasoline to the necessary levels; and on this subject, I would like to quote from remarks of Dr. Herbert C. McKee of Southwest Research Institute and present Chairman of the Texas Air Control Board who commented as follows on April 14, 1969:

The presence of polynuclear aromatic compounds in vehicle exhaust brings up another question related to the lead content.

Various suggestions have been made in the past for reducing substantially the lead content of motor fuel even though, as the discussion at this symposium indicates, there is no clear evidence that the present atmospheric lead levels are detrimental to human health.

An increase in the aromatic content of fuel inevitably leads to an increase in the polynuclear aromatic content of the exhaust, although this relationship is not necessarily on a one-for-one basis.

The exact role of polynuclear aromatic compounds in causing cancer is not known and may not be completely understood for years.

However, 3, 4-benzpyrene and other polynuclear aromatic compounds do induce tumor formation in experimental animals, which at least points a finger of suspicion at these materials as hazards to human health.

Epidemiological evidence would indicate that the hazard is likely small since it appears that smoking is a much more dominant factor in causing lung cancer than air pollution.

Also, polynuclear aromatic compounds in the atmosphere come from a variety of sources in addition to motor vehicles, especially in coal-burning cities.

While there is no reason to suspect that serious hazards exist at this time, any control measures which would cause a considerable increase in the polynuclear aromatic content of the atmosphere should be viewed with suspicion until more information is available.

Therefore, cutting down on the lead content of motor fuel to reduce a suspected, but unknown and unproved health hazard, might increase another health hazard that is suspected but equally unknown and unproved.

Trading one unknown hazard for another hardly seems appropriate, especially since lead additives have been used in motor fuel for over 40 years.

After that period of time, and after all the experimental work performed, the hazard must not be too great if scientists still debate the question at meetings such as this.

No urgency is evident which requires immediate action, and it would seem prudent to wait, in the hope that a better estimate can be obtained in the next year or two concerning the relative hazards of both lead and polynuclear aromatic compounds.

Any necessary control measures could then be initiated, and avoid the danger that action taken to reduce a presumed hazard might create a separate but possible greater hazard.

Lastly, the Bureau of Mines reported on this subject and concluded as follows:

Changes in fuel formula to provide adequate octane quality without use of lead additive were found to affect the pollution potential of the emissions in significant degree and the effects were largely unfavorable.

If information required of a manufacturer indicates any impairment of the pollution abatement program in the use of the additive, then again, I urge that the problem be handled by eliminating the emission rather than arbitrarily eliminating the product itself.

If subsequent information indicates that we must turn to fuel composition control and additive elimination rather than exhaust control as a solution to automobile pollution problems, I would support this drastic approach.

However, I see no evidence of need for it at this time.

In the same vein, although the question of danger to health by the use of lead additives in fuel has not been raised and our evidence indicates this to be not a problem, I want to make clear that if this is shown to be the case, the Du Pont Company will follow its long-established practice of withdrawing any product from the market that is found to adversely affect public health.

I recognize that the bills under consideration here today contain a number of other significant proposals for granting additional power to the Federal Government.

I feel that the areas I have already discussed dealing with the establishment of ambient air quality standards and implementation plans, together with the related philosophy, are the most significant contributions that can be made by Federal legislative changes at this time.

If there are other issues about which the subcommittee wishes to question me, I would be glad to attempt to respond.

Again, thank you for providing me with this opportunity to express my views and I hope they have been helpful to the subcommittee.

Senator Boggs (presiding). Thank you, Dr. Lenher, for your very fine statement. It will be helpful to our committee. We appreciate your being here.

I have a few questions. You mention in your excellent statement a quote from the Bureau of Mines on the point that the removal of lead from gasoline had an unfavorable effect on emissions. Could you elaborate on that? Do you have any figures that would show what that unfavorable effect was?

Mr. LENHER. The unfavorable effect, Senator, is an increase in the carbon monoxide and hydrocarbon content.

If you would like to explore that in greater depth for the record, I have colleagues here who are fully informed on the details of this and I would be glad to have them come forward and give a particularized response to your response.

Senator Boggs. If you don't mind, I think that might be appropriate at this point. Would you introduce your colleagues?

Mr. LENHER. I would like to introduce Dr. Donald Diggs, one of our authorities on this subject.

Senator BOGGS. I will repeat my question. I was referring to Dr. Lenher's reference to the Bureau of Mines study in his testimony. Could you make any further comments on that to show what the unfavorable effect was.

Mr. DIGGS. Yes, Senator Boggs.

The Bureau of Mines conducted a fairly extensive program in which they evaluated the pollution potential of several different kinds of gasoline. They made prototype un-leaded gasolines which in their judgment would represent the kind of fuel composition which would be required if lead were prohibited in gasoline.

They then ran tests in vehicles to compare the pollution potential of these gasolines with the conventional leaded gasolines which we have today.

They measured the photochemical reactivity of the exhaust products. This is the tendency of the exhaust products to undergo in the atmosphere the photochemical reactions which lead to the smog manifestations.

Their results showed that the prototype un-leaded gasoline gave emissions whose photochemical reactivity was approximately 25 percent greater than the comparable reactivity of emissions from conventional leaded gasoline.

Senator BOGGS. You indicate that it would increase the smog effect.

Mr. DIGGS. Yes.

Senator BOGGS. Would it therefore have an adverse effect on health?

Mr. DIGGS. I would not want to read that into the Bureau of Mines statement. I think the quotation Dr. Lenher gave is more precise as to their findings in that the effects were largely unfavorable in terms of photochemical reactivity.

This, as I have already mentioned, is the formation of the smog symptoms.

Senator BOGGS. Thank you very much, Dr. Diggs.

Dr. Lenher, at the beginning of your statement you discuss the need for improved environmental coordination.

As you know, a White House group headed by industrialist Roy Ash is studying this question at this time.

In addition, there are some bills that have been introduced in the Congress seeking to put the pollution control agencies together under a single Environmental Control Administration.

Is this the kind of coordination you had in mind in your testimony?

Mr. LENHER. Yes, it is, Senator, very directly. The exact form and shape would certainly have to be worked out, but that follows.

Senator BOGGS. At the present time a lot of effort and thinking are in progress on that very point.

Mr. LENHER. And I think it is constructive.

Senator BOGGS. It is my understanding that one of the arguments in favor of lead-free gasoline is that leaded gasoline hampers the operation of catalytical reactors which Detroit argues are the only devices that would enable them to meet the 1975 emissions standards.

Would you or Dr. Diggs be kind enough to compare the results of the thermal reactor that you have here in Washington, with those of the catalytic reactor, and give us any difference between the two approaches?

Mr. LENHER. Here again, if I may, I would like to call on Dr. Diggs because he is one of the authorities on this subject.

Senator BOGGS. Very good.

Mr. DIGGS. I will respond to your question first, Senator, by mentioning specifically the performance of the Du Pont developed exhaust manifold reactor which is the device on the car outside.

Representative emission values from cars equipped similar to the one we are showing downstairs are hydrocarbon emissions of 0.4 grams per mile. This value compares to the 1975 proposed Federal standards of 0.5 grams per mile.

On carbon monoxide, the reactor system will achieve values of approximately 8.0 grams per mile compared to the 1975 Federal standard of 11 grams per mile.

On nitrogen oxides, the Du Pont system will give values in the vicinity of 0.6 to 0.8 of a gram per mile as compared to 1975 standards of 0.9 grams per mile.

With respect to the performance of a catalytic system under similar conditions, I am afraid I am not able to help you because so far as we know, comparable values on catalytic systems have not been published and are not available to us.

Du Pont has not carried on with catalytic systems research comparable to that on the reactor.

Senator BOGG. Thank you very much, Doctor. I just have a couple of other questions.

Dr. Lenher, somewhere in the middle of your prepared statement, you mention the implementation of air quality standards.

As you point out, this might require strict controls in cities such as New York, for example, where the pollution problem is severe.

Under the implementation plan you describe, what would happen in areas that enjoy relatively clean air now? Would industry be permitted to continue to pollute for a number of years until the pollutants in the area reach the health-danger level?

Would you discuss that problem?

Mr. LENHER. With setting up emission standards, basing the enforcement and improvement of our environment on ambient air quality standards, I think the quality of our future environment would be protected nationally, Senator.

This is the dependence that we place on ambient air quality standards on a national basis. We would be able to control emissions from stacks, tailpipes, rather than depending on other methods of either improving or controlling pollution situations.

Senator BOGGS. Thank you.

One problem that concerns me is that the adoption of national air quality standards, followed by national implementation plans, might throw out a lot of the good work which has already been accomplished.

In other words, we would have to stop in our tracks, so to speak, until these new national standards are reached and the implementation plan completed.

Do you have any thoughts on how this problem of delay in change-over might be overcome?

Mr. LENHER. I think with the dependence on Federal standards, everyone would be able to plan effectively for the future and take definite steps with regard to existing installations with confidence that

there would be really on balance less delay than if you had a more fragmented approach.

The setting up of standards and their enforcement, I think, actually would let you move faster.

In our own company plans could be firmed up to change existing processes or to adopt existing control measures when we had the tests of the air quality that would show what needed to be done.

Senator Boggs. Thank you. I appreciate your answers to those questions, Doctor.

We are fortunate this morning to have with us the ranking minority member of the full committee, Senator Cooper, our colleague from Kentucky, and also our distinguished colleague from Tennessee, Senator Baker.

Senator Cooper.

Senator COOPER. I have enjoyed listening to your statement Dr. Lenher, and your efforts in working on this problem.

As I understand from your statement, you and your company favor the national air quality standards, national emission standards, and the national implementation.

Is that correct?

Mr. LENHER. Yes, we do.

Senator COOPER. Thus far in these hearings, it seems the approach with national air quality standards and regional air quality standards has caused some confusion.

Is there a necessity for such a choice? It would seem to me it would be of value to apply national standards immediately and as quickly as we can in order to place a floor so to speak on the control.

Why would it be wrong, at the same time, to go ahead with the development of regional standards in order to give an opportunity in certain areas of this country as soon as possible to reach an enhancement of air quality?

I gather from what you say that you like the national standards because it would enable industry and persons to know where they are going. But is that consistent also with the purpose of these bills, which is to enhance the quality of the air?

Mr. LENHER. I think confidence in actions taken to improve our environment, particularly those taken by industry where you have to be very careful to watch the competitive position, both company against company and one region against another, I think there Federal standards would be very helpful.

I am assuming that the Federal emission standards that are set would be wisely arrived at, and that the Federal Government could draw on all of the expertise in the country in setting these emission standards.

If there is a need, say, in a highly congested urban and industrialized area for further refinements, for stricter regulations, these could be promulgated on a regional basis, Senator.

But the Federal emission standards would be set sufficiently stringently so that the Nation's health would be protected in total.

The emission standards set could take account, and I am sure would wisely take account, of peculiar wind conditions or geographical situations, so I would think there would be a minimal requirement for more stringent regional standards.

Senator COOPER. That is what I suggested for a few days ago. I don't see any conflict. I like the idea of setting national standards as quickly as possible, but I would not want to foreclose efforts to set regional standards in order to provide an enhancement of air quality.

As I gather also from your statement, you consider that approach would have economic effects, that certain regions would be able to attract industry and others would not. Is that true?

Mr. LENHER. Yes, that is right.

Senator COOPER. We are moving ahead towards better and higher quality standards. That is the purpose of this committee, the purpose of the Congress and the purpose of the people.

How do you exercise that?

Mr. LENHER. As I said in my statement, I think this relationship of emissions to air quality standards is basic, and if you would be interested in seeing in a little more detail as to how we think these emission standards can be applied very generally, I have here another of my colleagues who we consider an authority on emissions.

He has a few charts which I think will illustrate the point, Senator, that you are primarily interested in. I would be glad to ask him to come forward, if you would like to explore this a little further.

Senator COOPER. Unfortunately, I have to go to another committee at this time.

I will yield to my colleague from Tennessee.

Senator BOGGS. Thank you, Senator Cooper. Senator Baker, we are glad to have you with us this morning.

Senator BAKER. Thank you, Mr. Chairman.

It seems to me that we might serve some purpose by trying to make sure that we fully understand and that the record fully disclose the difference between ambient air quality standards and emission standards.

You do, in fact, advocate the establishment of national emission standards for automobiles, is that correct?

Mr. LENHER. Yes.

Senator BAKER. While this isn't directly related to your area—

Mr. LENHER. I am in favor of ambient air standards.

Senator BAKER. There is a very real difference between emission standards and ambient air quality standards.

Mr. LENHER. Yes.

Senator BAKER. You are speaking now of national ambient air quality standards as distinguished from exhaust or stack emission standards.

Mr. LENHER. Yes.

Senator BAKER. That is the purpose and thrust of your testimony.

Mr. LENHER. Yes.

Senator BAKER. Would you oppose exhaust pipe or stack emission standards on a uniform Federal basis, or is that relevant to your point?

Mr. LENHER. No, I would not oppose those.

Senator BAKER. That is the difficulty we have in distinguishing between ambient air quality on the one hand which can tolerate differences and the emission levels, depending on the atmospheric characteristics of a particular area.

In the Los Angeles basin we may tolerate 4 grams per mile and in New York City perhaps 6. So you can permit a difference in the quality of the ambient air.

But then when you are speaking about what comes out of exhaust spheric situation, then it follows that if we are speaking just of the total collection of emissions from the exhaust pipes, that, then, does pipes, regardless of the inversion layer if any, or the unique atmosphere effectively preclude the possibility of adverse regulation.

Mr. LENHER. When you control the emission from the tailpipe you really have the most practical way of controlling.

Senator BAKER. You do, indeed. As a matter of fact, I have long been tempted to believe that ultimately we must go to a system of stack emission and exhaust pipe emission standards as distinguished from ambient air quality standards.

But I think you will find, as I have found, that there will be an enormous hue and cry when that is advocated.

Well, so much for that.

May I ask you about your statement on page 2 of the summary in which it says, "In other testimony, Mr. Lenher said that public interest would not be served by the banning of leaded gasoline."

I apologize for being a little late in getting here this morning.

Have you already touched on the subject of whether or not your manifold reactor system will work just as well on leaded gasoline as it will on un-leaded gasoline?

Mr. LENHER. We didn't touch on that particular point, but again, I would like to call on Dr. Diggs to deal with that for you, Senator.

Senator BAKER. Thank you.

Mr. DIGGS. The answer to your question, as I understood it, Senator, is yes, the device works equally well on leaded or un-leaded gasoline.

Senator BAKER. Can you tell me whether or not these results that I see published in your booklet entitled "Du Pont Exhaust Manifold Reactor to reduce Exhaust Emissions" are based on actual road experience—I take it it is since you have mileage figures—or whether it is based on static base testing?

Mr. DIGGS. The numbers which you see in this part of the leaflet, in which the performance of our system is compared to the 1975 standards were obtained by the specified Federal test procedure in which the vehicle is run through certain regimes.

Senator BAKER. The four-part regime as used in the California situation?

Mr. DIGGS. That is right. These are the official certification type tests.

Senator BAKER. Just as a matter of curiosity, and it probably has nothing to do with your system—it would have something to do with all—could those figures be substantially improved, in your personal judgment, by a change in the induction system, finely controlled fuel injection in the carburetor manifold system?

Mr. DIGGS. This is one way in which the emissions can be controlled.

Senator BAKER. What I am driving at is that in all four modes of the California system for measuring, you are, in effect, getting an average under several operating conditions.

I am intrigued with the relatively new fuel injection system that the Volkswagen people have produced which appear to me to give almost optimum mixtures of air to fuel in almost every driving range.

Would that system substantially improve your performance figures, in your judgment?

Mr. DIGGS. I can't answer that question directly, because we have not tried that particular experiment. But if I might say just a word in response to the idea you are pursuing, there are two broad ways in which you can attack the problem of vehicle emissions.

One is the method you have outlined by which the mixture, the fuel and air which the engine takes in, the proportional in an optimum manner.

The fuel injection system I think potentially can do a somewhat better job in this regard than the carburation system, though probably at increased cost.

This will result, I believe, in improvement in the lowering of the hydrocarbons and carbon monoxides.

The other general approach is the one which the reactor system on which we have been working takes. That is to oxidize the materials which come out of the engine on the exhaust side.

Senator BAKER. What I am really asking is whether or not a combination of these two wouldn't be superior to the results you have.

Mr. DIGGS. The system with which we are working here and the numbers which you see in the leaflet were obtained by optimizing all the particular adjustments which are available in this particular system which includes the proper adjustment of the fuel-air mixture.

Whether we would have done a better job with these numbers had we had a fuel injection system available on the system, I don't know.

Senator BAKER. Do you have any plans to find out?

Mr. DIGGS. Well, yes. We are looking into a test with the Volkswagen-type of fuel injection system when we can adapt one to an American size engine.

Senator BAKER. Are there other manifold reactor systems that are not immune from the effects of lead and gasoline?

Mr. DIGGS. If I understand your question, you are talking about non-catalytic systems?

Senator BAKER. I am thinking of catalytic manifold and muffler systems whose performance deteriorates in the presence of leaded gasoline.

Mr. DIGGS. The system we are working with, sir, is noncatalytic. It has no catalysts in it. It is a thermal system.

As I have already indicated, it is not adversely affected by the presence of leaded gasoline.

The catalytic systems, which operate on an entirely different principle, are adversely affected by the lead salts that pass over them in the exhaust system.

Senator BAKER. I notice you project in your pamphlet results through 1985.

Might I ask whether or not the catalytic system would come closer to reaching these U.S. goals by 1980 than the thermal reactor systems?

Mr. DIGGS. I don't have enough information, really, to answer that question positively.

It is our opinion that from a practical viewpoint the exhaust manifold reactor is a better way of achieving these goals. It will do the job in a more economical and maintenance-free fashion.

Du Pont has not done sufficient work with catalytic systems to answer your question specifically.

As I responded earlier to Senator Boggs, we know of no published information on the catalytic system which is as good as the results you see there.

Senator BAKER. I would like to take this opportunity to commend both of you for coming forward with some very meaningful research.

I certainly believe the internal combustion engine has a future which will be preserved by research.

Thank you.

Senator Boggs. I suggest that the publication to which you referred be made a part of the appendix of today's record.

Further, I might suggest that if, Dr. Lenher, you wish to submit for the record any further detailed information on test data for the Du Pont manifold thermal reactor, the committee would be glad to have it as a matter of background and information.

I don't know if you recall or not, but when you were a member of Secretary Gardner's committee that prepared the report, "A Strategy for a Livable Environment", what recommendations, if any, did it make regarding lead additives?

Mr. LENHER. No, I don't think we dealt with the problem, Senator Boggs. We didn't make specific recommendations in our report. They were largely of a general nature.

Senator Boggs. You mentioned that there is no evidence that lead in gasoline has a health effect. I wonder if you or Dr. Diggs, or anyone with you, would care to discuss the action of such countries as Sweden and Japan, to reduce the use of lead as a fuel additive.

Mr. LENHER. I would prefer not to do that personally, but we have here Dr. Stopps, who is an authority on that subject.

Senator Boggs. We will be glad to have him appear. Would you state your name for the record?

Dr. STOPPS. My name is Jim Stopps. I am a physician and Assistant Director of the Haskell Laboratory for Toxicology.

Senator Boggs. You are an M.D.?

Dr. STOPPS. I have a British qualification. It is not an American M.D.

As you will have gathered from the literature in the press, there is some divergence of opinion amongst the experts as to whether lead constitutes a health problem at this time, or in the future.

I am not privy to all of the information that was made available in Sweden. Our position is that our own research has shown that the lead levels in people have not risen during the time of the introduction of lead anti-knocks, in other words, during the past 40 years.

We have very carefully surveyed the literature and there does not appear to be evidence of a rise in lead levels during this time.

We feel this is the germane time because of the introduction of lead anti-knocks. Therefore, we feel that the effect of the introduction of lead anti-knocks has been quite small. We are not denying there is an effect if you compare lead levels in rural people with urban people. You will find a small difference.

On the other hand, this small difference is on top of the natural level of lead which all of us carry because of the lead in soil which naturally gets into plants and into animals and constitutes a portion of our diet.

The major part of the lead that is in our bodies comes from the diet and the contribution from the automobile seems to be a small one.

Senator Boggs. Thank you very much, Doctor.

I might say that due to the rainy weather this morning, the car that was mentioned has been parked on the upper level of the New Senate Office Building garage. It is available for anyone, the public or members of the committee, to see. There are engineers there to discuss it and explain it.

I look forward with pleasure for seeing it myself. It will be there until sometime later this afternoon, I understand.

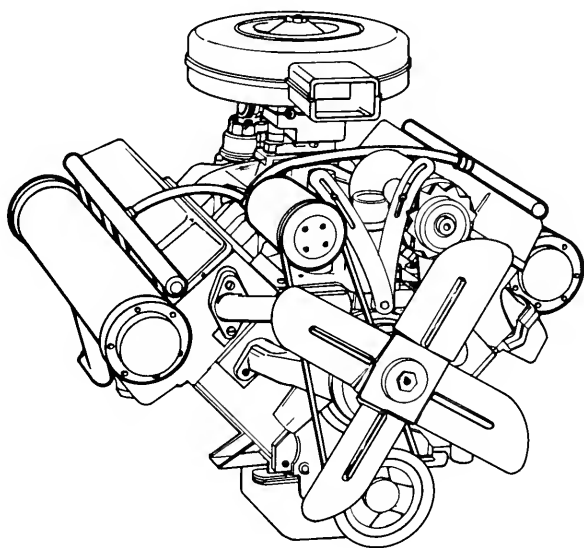
Thank you very much, Dr. Lenher and your associates. We appreciate your presence.

Mr. LENHER. Thank you.

(Materials presented by Dr. Lenher for inclusion in the record follow:)



EXHAUST MANIFOLD REACTOR



To Reduce Exhaust Emissions

EXHAUST MANIFOLD REACTOR... PROGRESS AND PROBLEM

Every advance in technology tends to introduce new problems as well as benefits. This is simply part of the price of progress, for no event, even in technology, is unaffected by or fails to affect other events.

Motor vehicles—autos and trucks—are a case in point. Their convenience and necessity are unquestioned. Their development has led to physical changes of the very face of the earth—and vast changes in the very nature of society. But a price we pay for these benefits is the concern we feel about the emissions from these multitudinous sources. This is a subject of increasingly broad and searching inquiry, with particular attention directed to the possible effect on public health and comfort.

Du Pont is intimately involved in the investigation of automotive emissions because of its position as a major supplier of chemical additives to the petroleum industry.



**CUTAWAY VIEW OF
EXHAUST MANIFOLD REACTOR**

One important area of this investigation is the development of practical methods to reduce pollutants in vehicle exhausts. The most promising method, Du Pont believes, is the exhaust manifold reactor, shown in cut-away form. The product of the combined talents of dozens of Du Pont physicists, chemists, engineers, and technicians, this non-catalytic device has achieved the best control of exhaust emissions to date by any system known.

HOW IT WORKS

In principle, the reactor provides a high-temperature zone in which auto exhaust components are oxidized to carbon dioxide and water before they pass out through the exhaust system.

The reactor is mounted on the engine and replaces the conventional exhaust manifold. The reactor consists of an insulated outer shell in which is mounted a tubular core. Exhaust gases, mixed with air supplied by a conventional air injection system, first enter the tubular core which is designed to prolong their stay in the high-temperature zone thus speeding their breakdown into carbon dioxide and water. The gases then pass through the space between the core and the outer shell and exit into the conventional exhaust system.

HOW IT PERFORMS

Extensive testing of exhaust manifold reactors has shown that they are capable of reducing exhaust emissions to very low levels. Results of a test covering 100,000 miles of operation using a popular make of car equipped with reactors are shown on charts.

Mileage was accumulated on a programmed chassis dynamometer following the driving schedule specified for the certification of emission control devices. Emission levels were below 30 ppm hydrocarbons and 0.6 percent carbon monoxide throughout most of the test compared to the 1970 standards of 180 ppm hydrocarbons and 1.0 percent carbon monoxide. Only

normal vehicle maintenance was performed; no maintenance of the exhaust reactor system was required.

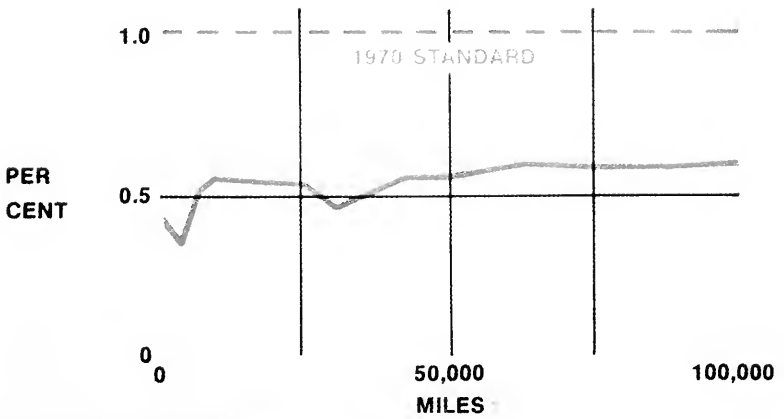
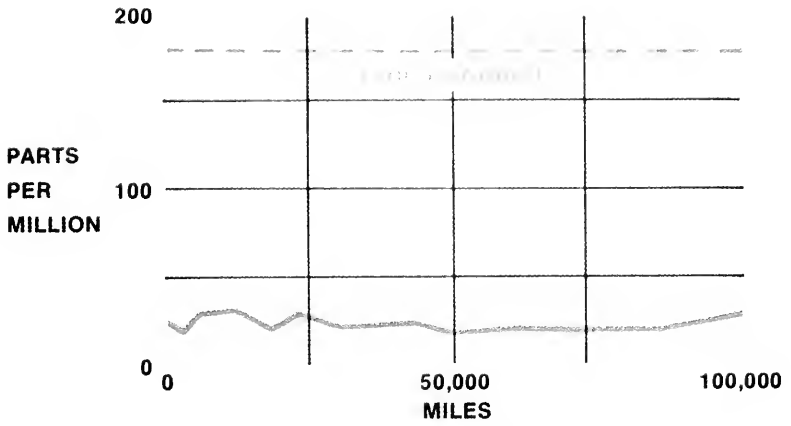
Reactors have been tested on other cars with various types of engines and transmissions. Similar emission levels were attained but long-term tests were not conducted.

Use of exhaust manifold reactors is fully compatible with the methods of controlling evaporative emissions from the fuel tank and carburetor which are being used on 1970 cars in California and will be used on 1971 cars in the rest of the United States. Also importantly, exhaust manifold reactors, while not of themselves having any effect on the emission of nitrogen oxides, are compatible with systems including exhaust gas recirculation that do reduce nitrogen oxides. Control of nitrogen oxide emissions from vehicles will be required beginning with 1971 models in California, with the standard being successively reduced to 0.9 gram per mile for 1975 models. Typical emission values from a vehicle equipped both with exhaust manifold reactors and exhaust gas recirculation are

	Gram per Mile		
	<u>HC</u>	<u>CO</u>	<u>NO_x</u>
Reactor System	0.4	8.0	0.9
1975 Standards	0.5	11.0	0.9

WHAT NEXT

Developmental models of the reactor have been made available to petroleum companies, automobile manufacturers and governmental agencies. Scientists point out that the principle behind this device is sound and well established; what still must be determined are the appropriate materials to be used, the most efficient size and the best way of producing it at the least possible cost to the automobile owner. Du Pont is confident that this type of reactor will be developed into a commercial reality with wide acceptance.



EXHAUST MANIFOLD THERMAL REACTORS - A SOLUTION TO
THE AUTOMOTIVE EMISSIONS PROBLEM

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FOR PRESENTATION AT THE 68TH ANNUAL MEETING OF THE
NATIONAL PETROLEUM REFINERS ASSOCIATION
APRIL 5-8, 1970
SAN ANTONIO, TEXAS

MANIFOLD THERMAL REACTORS FOR EXHAUST EMISSION CONTROL

This paper will describe an exhaust emission control system developed by Du Pont which will meet the 1975 gaseous exhaust emission standards proposed by the U.S. government. These proposed standards can be met without any changes in present-day fuel composition and, more specifically, without restrictions on the use of lead anti-knocks. The paper also will present data which give promise that the 1980 goal for gaseous emissions also can be met with further development of the system.

The gaseous emission control system combines two major devices. These are:

1. An exhaust manifold thermal reactor to control the hydrocarbons and carbon monoxide to very low levels. This device has been shown capable of controlling emissions for the normal lifetime of the car without attention or maintenance.
2. An exhaust gas recirculation system to control nitrogen oxide levels. Although not yet tested as extensively as exhaust manifold reactors, the exhaust gas recirculation system has been operated for 25,000 miles without maintenance.

In addition to the system for controlling gaseous emissions, two separate systems have been developed to reduce particulate matter in the exhaust. Data will be presented to show that these systems are very effective for removal of particulate lead salts from the exhaust. One system has been operated on a car for 67,000 miles without maintenance or attention, the other for 26,000 miles.

EMISSION STANDARDS

Before examining the performance of these emission-control systems, consider first the standards put forth by the U.S. government and the State of California for emission levels from automobiles. Shown in Table 1 are the maximum allowable concentrations in grams per mile of the various components of the exhaust for the different years. The proposed standards for 1975 require that hydrocarbons be reduced to less than 0.5 gram per mile, carbon monoxide to 11 grams per mile, nitrogen oxides to 0.9 gram per mile and particulate matter to 0.1 gram per mile. For the year 1980, goals of approximately one-half of the 1975 standards have been proposed.

EFFECTIVENESS OF THERMAL REACTOR SYSTEMS

Shown in Table 2 are the exhaust emission levels obtainable with exhaust manifold thermal reactors and an exhaust gas recirculation system installed on two 1970 models of a popular four-door sedan. The vehicles are equipped with V-8 engines and automatic transmissions. Emission levels are 0.2 gram per mile of hydrocarbon, 8 grams per mile of carbon monoxide and 0.7 gram per mile of nitrogen oxides. Comparing these values to the 1975 and 1980 levels, it is clear that the gaseous emissions from these vehicles are well below the 1975 levels in all cases and, in the case of the

hydrocarbons, are below the 1980 levels.

These low-emission levels are achieved with little sacrifice in economy or vehicle performance. As shown in Table 3, the fuel economy of these equipped vehicles averaged about 14.5 miles per gallon when driving a city-suburban course on the road as compared with 15.3 miles per gallon average for two production 1970 vehicles of the same model. This loss of 0.8 mile per gallon represents only a 5 percent loss in fuel economy to achieve these very low emission levels. Similarly, only slight losses occur in terms of full-throttle acceleration capability. The general driveability of the vehicles is quite good. They start readily when cold, they warm up normally, and the warmed-up driveability is equivalent to current production vehicles in all respects.

HOW THERMAL REACTORS WORK

The exhaust manifold reactors are mounted on the engine in place of the conventional exhaust manifolds and air is injected into the exhaust ports from the air injection system used on many production cars. The reactors provide a high-temperature zone in which the hydrocarbons and carbon monoxide are oxidized thermally to carbon dioxide and water. No catalytic device is employed. The reactor, as shown in Figure 1, consists of an outer shell in which is mounted a tubular core and a shield to insulate the hot core from the cooler outer shell. Exhaust gases mixed with the air supplied by the air injection system first enter the tubular core which is designed to promote mixing and initiate oxidation. The reacting gases then pass sequentially through the spaces between the core and the shield and between the shield and the outer shell. Oxidation is completed during this passage before the gases exit into the conventional exhaust system. Shown in Figure 2 is a photograph of one of the exhaust manifold reactors cut away to reveal the details of the inner core and the radiation shield. Shown in Figure 3 is a set of reactors mounted on the engine in the car in place of the exhaust manifolds. Air is delivered to the reactors from the air pump to a manifold with individual branches leading to each of the exhaust ports.

The capability of exhaust manifold reactors in controlling emissions of unburned hydrocarbons and carbon monoxide when used alone without exhaust gas recirculation is shown in Table 4. Hydrocarbons are less than 0.25 gram per mile and carbon monoxide less than 4.5 grams per mile. These levels are well below both the 1975 proposed levels and essentially at the 1980 goal levels. As mentioned before, the reactors have little effect on vehicle economy or performance. Shown in Table 5, the fuel economy of the vehicle equipped with the exhaust manifold reactors is essentially equivalent to that of the standard 1970 vehicle equipped with the conventional emission-control system. Furthermore, the performance as measured in terms of the time in seconds required to accelerate at wide-open-throttle from 0 mph to 60 mph on a level road is essentially equivalent to that of the production model.

DURABILITY OF THERMAL REACTORS

Long-term tests of reactors show that they are capable of controlling hydrocarbons and carbon monoxide emissions for the normal life of the vehicle or 100,000

miles without any maintenance or attention. Shown in Figures 4 and 5 are the emission results of a test covering 100,000 miles of operation using a car equipped with an earlier model of the exhaust manifold reactors. These reactors were not as effective as the current designs. Figure 4 shows the exhaust hydrocarbon levels for the 100,000 miles; they were less than 0.4 gram per mile throughout the entire test. In Figure 5 it can be seen that the carbon monoxide levels were approximately 15 grams per mile for the test, showing little tendency to increase with mileage. Mileage was accumulated on a programmed chassis dynamometer following the driving schedule specified for the Federal certification of emission control devices. A commercial gasoline containing lead was used and only normal vehicle maintenance was performed. No maintenance of the exhaust reactor system was required.

At the conclusion of this 100,000-mile test on an earlier Type I model of the reactor, it was found that holes had been eroded in each of the two baffles within the reactor. In this particular reactor design the baffles, in close proximity to the exhaust ports, served to direct the hot gases to the center of the core. Although the erosion did not affect emission control performance, the core was redesigned to eliminate the baffles. Laboratory engine tests under severe-duty conditions for extended periods show that with this improved design erosion of the reactor core has been reduced by 3 to 4 orders of magnitude. A car equipped with this new design, the genesis for Type V and VI reactors, is now being evaluated in an endurance test on the programmed chassis dynamometer.

Because the temperatures in the interior of the reactors are of the order of 1650 F during normal operation, the inner core must be constructed of materials which can withstand these temperatures for long periods of time. Such a material, Incoloy 800, was used in the test described. Another useful material for this application is 316 stainless steel. Both of these alloys are relatively expensive, \$1.20 to \$1.40 per pound, because they contain significant quantities of nickel. In an effort to reduce the cost of exhaust manifold reactors, the help of several speciality steel companies was solicited to develop lower cost materials of construction. Several new, and promising, alloys have been tested in long-term tests on the engine dynamometer stand. These newly developed materials do not contain costly or strategic elements such as nickel and are considerably less expensive. The composition of one of the typical alloys under consideration is 18 percent chromium, 2 percent aluminum, and 1 percent silicon. Long-term vehicle testing of the latest design reactors constructed of these low-cost materials soon will be under way.

OTHER CONSIDERATIONS

Exhaust manifold reactors at the current state of development are larger than the conventional exhaust manifolds and, therefore, because of space limitations, cannot be installed on all vehicles produced today. Some vehicles would require redesign of the cylinder heads and relocation of some of the components within the engine compartment.

A second consideration bears on reactor temperatures. Excessively high temperatures in the interior of the reactor may possibly occur under some unusual operating

conditions. As an example, should the reactors be at an abnormally high temperature because of prolonged severe load and high speed which might occur as a car pulls a trailer up a long mountain road at or near full throttle, and should a spark plug misfire at this time, the unburned air/fuel mixture coming from the misfiring cylinder may burn in the reactors, releasing considerable energy and raising the temperature of the reactors to the melting point of the materials used. This does not occur in normal operation. Partial control of these high temperatures can be achieved by simply cutting off the injected air to the reactors and thus lowering their temperature under the severe-duty operation. However, in addition to such an air-cut-off system, a high-temperature sensing device will have to be incorporated to warn the driver of the engine malfunction and reactor over-temperature. This warning would require that the driver reduce the power output of the engine and turn it off as soon as practical. This over-temperature warning system would then function in the same manner as the warning of the loss of engine oil pressure or coolant system over-temperature does on current vehicles.

CONTROL OF NITROGEN OXIDES

While exhaust manifold reactors provide excellent control of hydrocarbons and carbon monoxide, they do not by themselves have any effect on nitrogen oxide emissions. To control simultaneously hydrocarbons, carbon monoxides and nitrogen oxides requires a combination of systems. Exhaust gas recirculation is presently the preferred method for nitrogen oxide control and in combination with exhaust manifold thermal reactors will control all gaseous emissions.

Several systems to provide exhaust gas recirculation have been studied. The one currently being used was developed by Esso Research and Engineering Company and is shown schematically in Figure 6. Exhaust gases are taken from the exhaust pipe just ahead of the muffler and are directed into the carburetor between the venturi section and the throttle plate. The amount of exhaust gas which enters the carburetor is metered by an orifice located in the recirculation line. A simple vacuum-operated, on-off valve shuts off the recirculation at idle to give smooth engine operation and also at wide-open-throttle to prevent loss in vehicle performance. A small cyclone separator to remove particles which might plug the recirculation system can be incorporated in the recirculation line if needed. The introduction of the exhaust gas into the carburetor dilutes the incoming fuel/air mixture to the engine with the inert material (exhaust gas) and lowers the peak combustion temperatures within the cylinder, thus reducing the formation of nitrogen oxides.

Such a system has been installed on a 1970 vehicle equipped with a V-8 engine and an automatic transmission. The system was set to give a recirculation rate of approximately 15 percent which was sufficient to reduce the nitrogen oxide levels of this vehicle to the 1974 California standards of 1.3 grams of nitrogen oxides per mile. The vehicle has been operated on a programmed chassis dynamometer for 25,000 miles on a non-detergent fuel containing 3 grams of lead per gallon and without a cyclone separator in the exhaust gas recirculation line. During this entire test the exhaust gas recirculation system has required no maintenance. The gas recirculation rate has remained at 15 percent and the nitrogen oxide levels have been unchanged. Some deposits

have started to accumulate in the throttle section of the carburetor. Additional tests will be conducted with a fuel containing a carburetor detergent.

PARTICULATE EMISSIONS

The combination of exhaust manifold reactors and exhaust gas recirculation has demonstrated the ability to control all of the gaseous emissions to quite low levels. One additional emission standard has been proposed recently; the control of particulate matter in the exhaust system. The U.S. government has announced its intention to establish standards for the years 1975 and 1980. Although particulate matter has not been defined, and neither measuring technique nor test cycle has been specified, it is proposed to reduce the exhaust particulate matter substantially. The government has estimated that current vehicles emit approximately 0.3 gram per mile of particulate matter. A standard of 0.1 gram per mile has been proposed for 1975, with a 1980 goal level of 0.03 gram per mile.

To date, no meaningful information has been available regarding total particulate emission rate from vehicles under realistic driving conditions. It is known that automotive exhaust contains solids such as lead salts, carbon, iron rust, and semi-solid or heavy liquid materials such as tars and oil mists, but little is known about the relative amounts or composition of these materials. Further, there is no clear definition at this time of the term "particulate matter" as it pertains to exhaust. Do such materials as the tars and oil mists fall into this classification? This lack of information on "particulate matter" is due to the fact that measuring and characterizing all particles in the exhaust is an exceedingly difficult task and the techniques and hardware needed to make these measurements are only now being developed.

Considerable progress has been made in Du Pont's Petroleum Laboratory in developing suitable particulate sampling systems and analytical procedures. Initially, efforts were directed towards the measurement and characterization of lead compounds and other more readily collectible and easy to analyze solid material, such as iron rust. These techniques have been well developed and are now used on a routine basis. Attention is now being focused on the total particulate emission measurement problem and vehicle tests are in progress to measure these emission rates on a gram per mile basis.

With regard to the removal of lead particulate from the exhaust gas stream, one of the more effective ways to accomplish separation and retention of such particulates is to employ an inertial device, such as a cyclone. To trap effectively lead particulates three important functions must be accomplished by the trapping system. First, the exhaust must be cooled so that the potential particulate matter can solidify in the exhaust stream. Secondly, the fine particles must be agglomerated into larger particles so that they can be easily separated from the gases. Finally, the particles must be separated from the gas stream with some device such as a cyclone and then retained in the exhaust system.

A schematic diagram of an exhaust particulate trapping system employing these three principles is shown in Figure 7. This system will be called SYSTEM A. The

cooling of the exhaust gas as it passes through a dual exhaust system is enhanced by the use of fluted pipes which provide more surface area than ordinary pipes and thus more effective cooling. Each exhaust line empties into a trap box in which the exhaust gas first passes through wire mesh to agglomerate the particles and then through a cyclone separator to separate the particles from the gas. The separated particles are collected in one portion of the box and the exhaust gas exits to the atmosphere through a tailpipe. The boxes have sufficient capacity to store all the separated lead salts for the life of the car, or 100,000 miles. The connection between the two exhaust lines just ahead of the trap boxes merely serves to balance the pressure in the two exhaust lines. A photograph of a trap box cut away to show the cyclone separator is shown in Figure 8. The wire mesh packing is omitted to permit a view of the cyclone separator.

A photograph of a more effective trapping system, SYSTEM B, as installed on a car is shown in Figure 9. Note that a portion of each of the dual exhaust lines a short distance from the engine incorporates two pipes. These pipes are lined internally with wire mesh to help agglomeration of the particles. In addition, this system differs from System A in that each side of the dual system exhausts into one box filled with wire mesh. The gases flow from this box to two cyclone separators, one in each of the rear fender wells. These two separators are the same as those used in System A.

The effectiveness of the two systems is illustrated by the data shown in Table 6. Trap system A maintained lead salt emission rates at 0.1 gram per mile in a 67,000 mile test on the programmed chassis dynamometer. A similar car but without traps will have an emission rate of 0.2 gram to 0.3 gram per mile. The emission rate for trap system B in a 26,000-mile test was 0.03 gram per mile. Whether trap system B really requires the two pipes on each side of the vehicle has not yet been determined.

As indicated earlier, materials other than metallic salts are emitted as particulate matter in the exhaust system. Such materials are difficult to measure, but one specific class of these materials, polynuclear aromatic compounds, has been measured accurately in the exhaust of vehicles. These compounds have been shown in various laboratory tests to be carcinogenic in terms of producing cancerous tumors when painted on the backs of mice. As shown in Table 7, trap system B was quite effective in reducing the amount of one of the more potent of the polynuclear aromatics, benzo [a] pyrene, in the exhaust. The traps brought about a several-fold reduction in the amount of this material when the vehicles were new and also after mileage had been accumulated.

Studies are continuing to define how much reduction of total particulate matter, both inorganic and organic, can be achieved by trapping systems. Systems based on other separation principles also are being examined. These studies are encouraging and indicate that substantial reductions in total particulate emissions can be obtained.

SUMMARY

1. Exhaust manifold thermal reactors combined with exhaust gas recirculation will control hydrocarbons, carbon monoxide, and nitrogen oxides to the levels proposed for 1975 by the U.S. government.

2. Exhaust manifold thermal reactors will operate satisfactorily with leaded fuels and it is believed, based on data contained in this paper, that an exhaust gas recirculation system can be developed which also will operate satisfactorily with leaded fuels.

3. Lead particulate emissions from the exhaust can be reduced to the level of 0.1 gram per mile with a relatively simple trapping system. A somewhat more complex system will reduce the level to 0.03 gram per mile.

4. Because the thermal reactor system can be used with leaded fuels, its commercial adoption would make it possible to attain very low levels of hydrocarbon, carbon monoxide and nitrogen oxides in the exhaust without changing fuel composition. Accordingly, it would make unnecessary major disruptions in the refining and marketing of gasoline and would result in the lowest overall cost to the motorist.

ACKNOWLEDGEMENT

The authors are indebted to Dr. G. H. Patterson of the Organic Chemicals Department Research Division for the data and information on particulate trapping systems.

TABLE 1
EXHAUST EMISSION STANDARDS AND GOALS

<u>Year</u>	<u>Emission Levels, Grams Per Mile</u>			
	<u>HC</u>	<u>CO</u>	<u>NO_x</u>	<u>Particulate</u>
1970	2.2	23.0		
1971*	2.2*	23.0*	4.0*	
1972*	1.5*	23.0*	3.0*	
1973	2.2	23.0	3.0	
1974*	1.5*	23.0*	1.3*	
1975*	0.5*	12.0*	1.0*	
1975	0.5	11.0	0.9	0.1
1980	0.25	4.7	0.4	0.03

Evaporation Losses - 6.0 grams per test in 1970
in California and 1971 nationwide

*California only

TABLE 2
COMBINED SYSTEMS MEET 1975 GASEOUS STANDARDS

	<u>Emission Levels, Grams Per Mile</u>		
	<u>HC</u>	<u>CO</u>	<u>NO_x</u>
1975 U.S. Std.	0.5	11.0	0.9
Car A*	0.17	8.3	0.7
Car B*	0.20	6.8	0.7
1980 U.S. Goal	0.25	4.7	0.4

* Reactors and Exhaust Gas Recirculation

TABLE 3
COMBINED SYSTEMS HAVE LITTLE EFFECT ON ECONOMY

	<u>Fuel Economy, MPG</u> <u>City-Suburban Road Course</u>
1970 Std. Car*	15.3
Car A	14.7
Car B	<u>14.4</u>
	-0.8 (-5%)

* Average of two cars

TABLE 4
REACTORS MEET 1980 GOAL LEVELS

	<u>Emission Levels, Grams Per Mile</u>	
	<u>HC</u>	<u>CO</u>
1975 U.S. Std.	0.5	11.0
Type V Reactors	0.20	4.5
Type VI Reactors	0.23	4.3
1980 U.S. Goal	0.25	4.7

TABLE 5
FUEL ECONOMY FOR TYPE V REACTORS

	<u>Fuel Economy, MPG</u> <u>City-Suburban Road Course</u>
1970 Std. Car	15.3
Type V Reactors	15.1
	<u>Acceleration Time, Seconds</u> <u>0 to 60 MPH</u>
1970 Std. Car	11.0
Type V Reactors	11.4

TABLE 6
TRAPPING SYSTEMS REDUCE EXHAUST PARTICULATE LEAD

	<u>Lead Salt Emission Rate,</u> <u>Grams Per Mile</u>
1967 Std. Car	0.2 to 0.3
1967 Car With Trap System A	0.1
1967 Car With More Complex Trap System B	0.03

TABLE 7
Benzo [a] pyrene Emission Rate
Micrograms Per Gallon of Fuel
Consumed

	<u>0 Miles</u>	<u>15,000 Miles</u>
1969 Make A	147	306
1969 Make A With Traps	35	67
1969 Make B	66	228
1969 Make B With Traps	24	6

Fig. 1 - Type V Shielded Exhaust Manifold Reactor

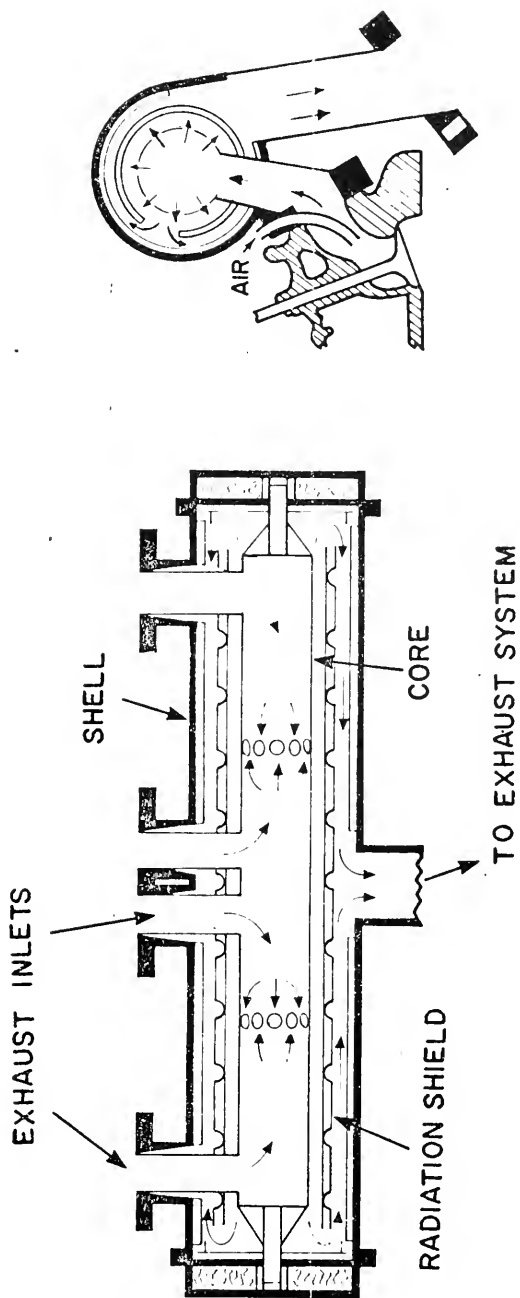


FIGURE 2 — CUTAWAY VIEW OF TYPE V REACTOR

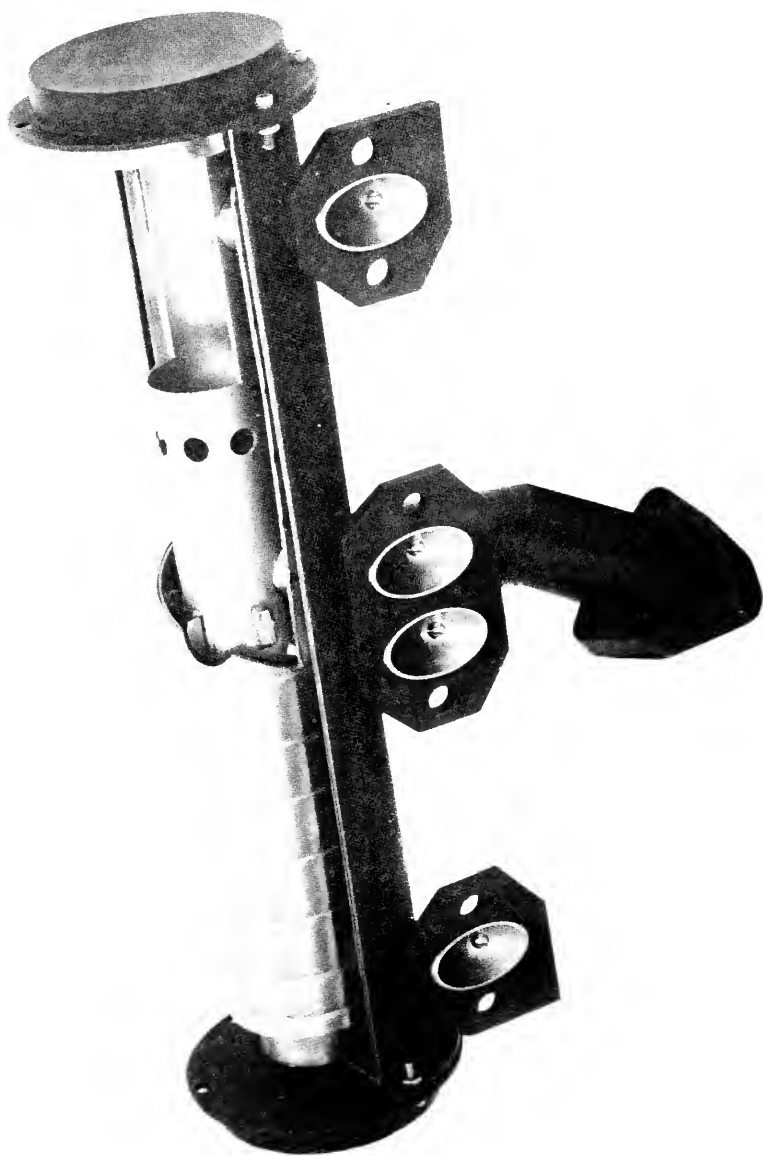


Fig. 3 - Type V Reactor Installed on Car

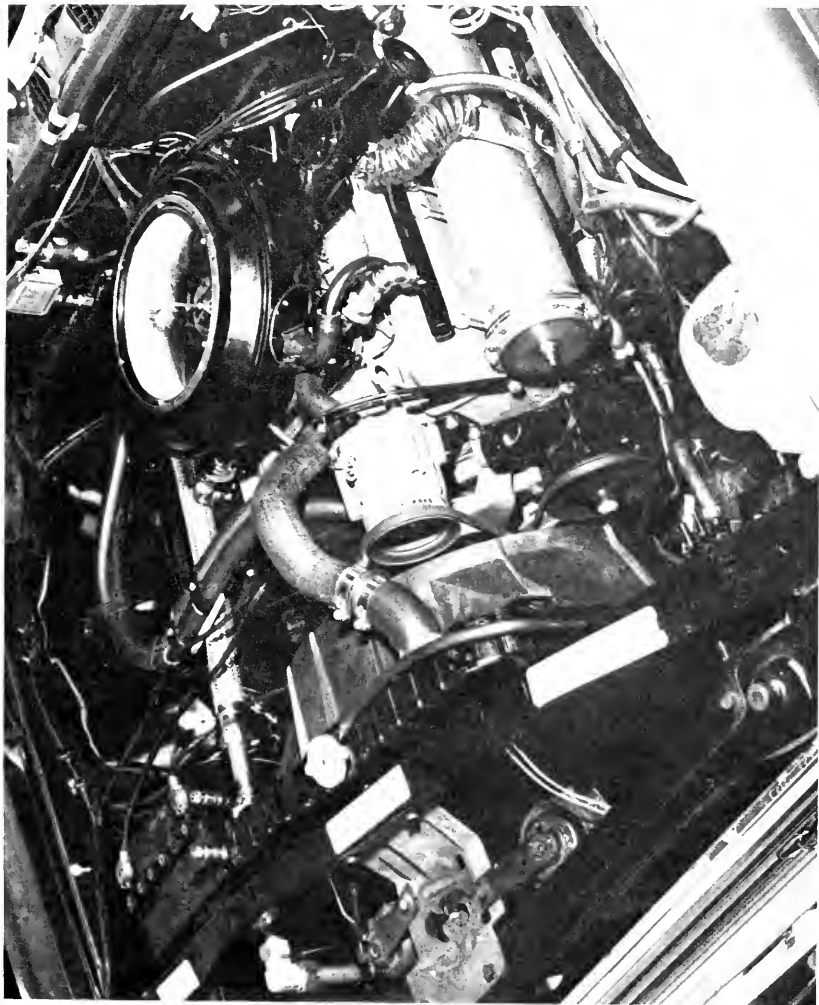


Figure 4

HYDROCARBON EMISSIONS WITH MANIFOLD REACTOR

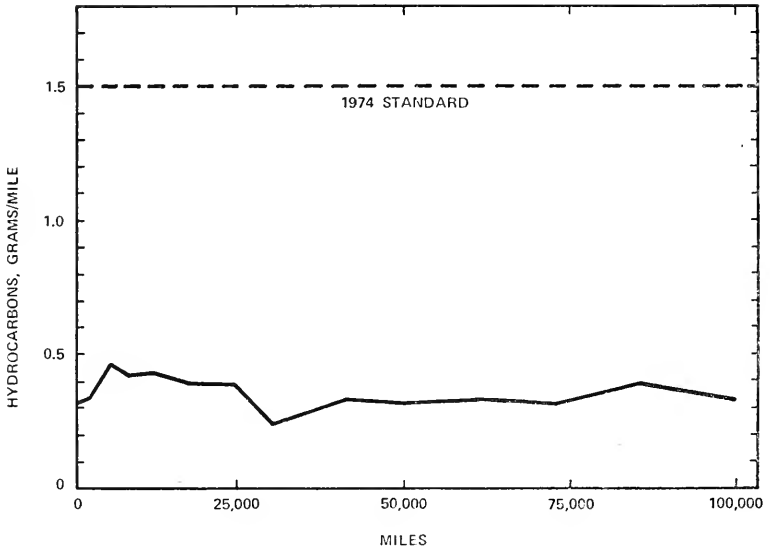


Figure 5

CARBON MONOXIDE EMISSIONS WITH MANIFOLD REACTOR

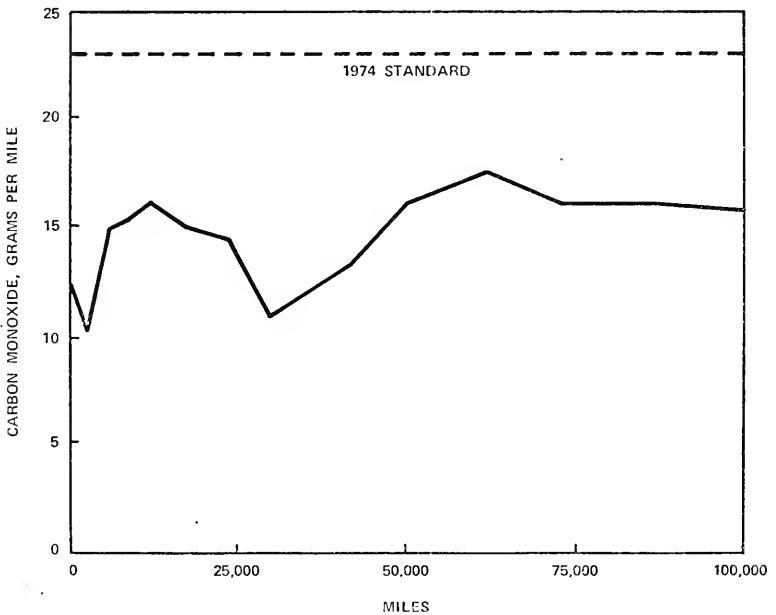


Figure 6
EXHAUST GAS RECIRCULATION SYSTEM

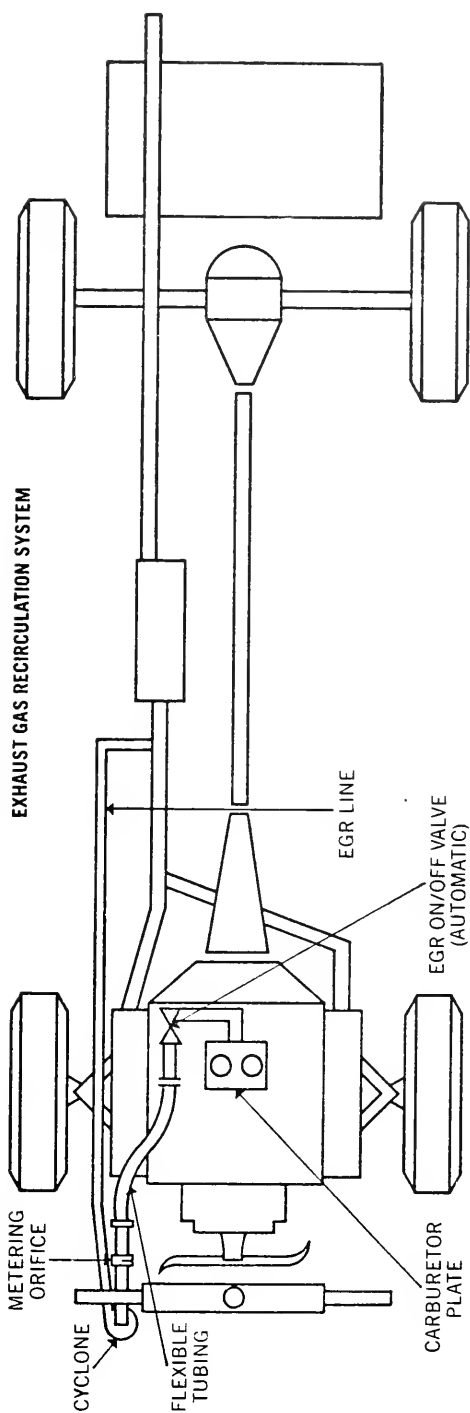


Figure 7
EXHAUST PARTICULATE MATTER TRAPPING SYSTEM "A"

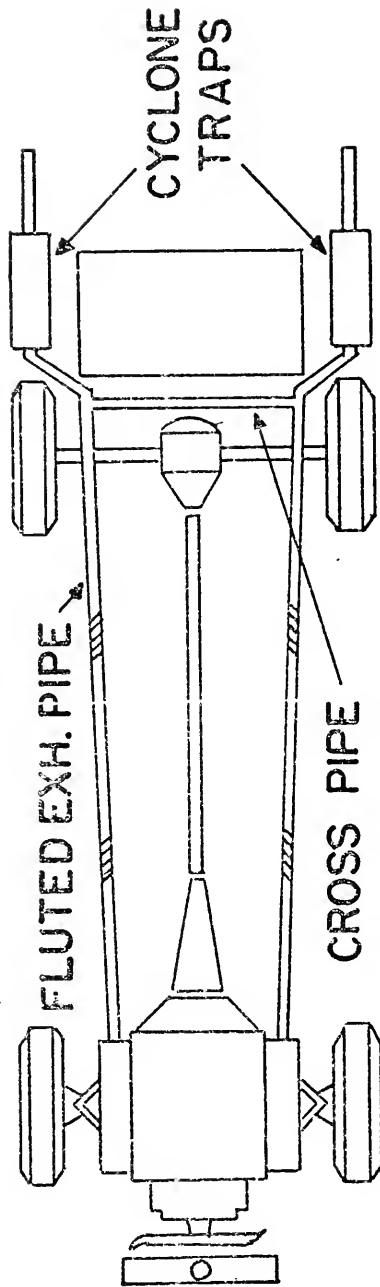


Fig. 8 - Cyclone Separator and Collection Box for Particulates (Screen Removed)

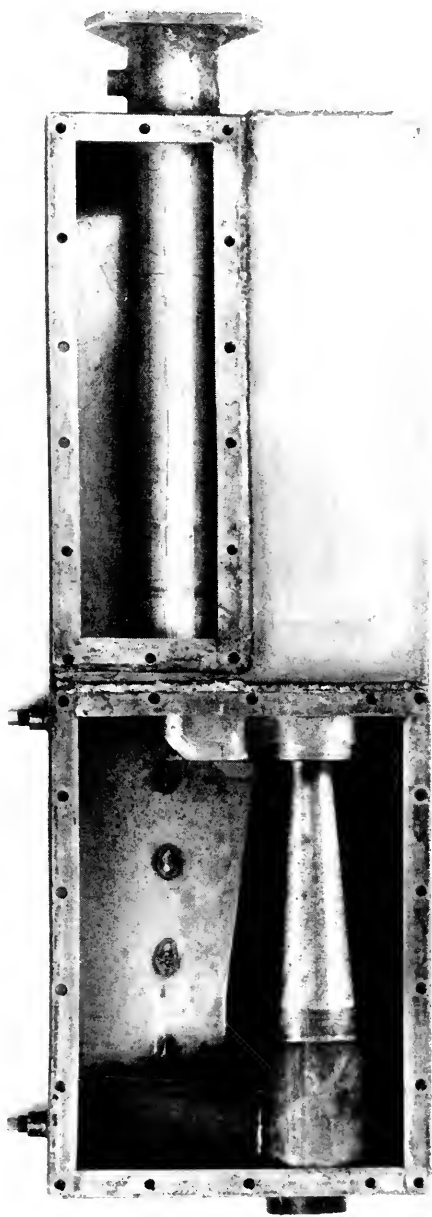
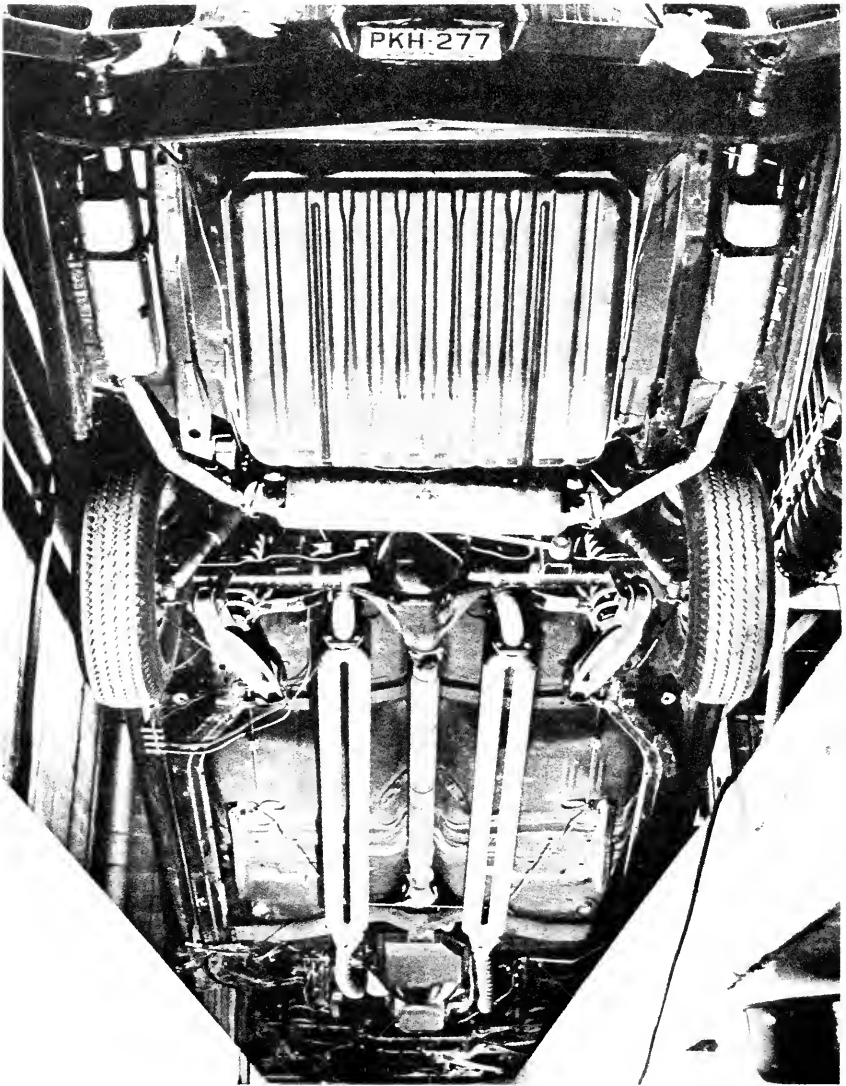


Figure 9 - EXHAUST PARTICULATE MATTER TRAPPING SYSTEM



Symposium on Air Quality Criteria —Lead

GORDON J. STOPPS, M.D.

In considering air quality criteria for lead, it should be noted that lead presents some interesting features not shared by other pollutants being discussed in this Symposium.

1. Lead is a normal and ubiquitous constituent of the earth's crust being present in an average concentration of about 16 parts per million.¹

2. Because of its ubiquitous nature, lead is absorbed along with other trace elements by plants and animals which in turn form the diet of man. Since this has been true for many millions of years, it seems reasonable to conclude that man has always had a level of lead within his body which has derived largely from the diet and was not the result of man's industrial activities. This level of lead constitutes a "background" body burden which is always present, although varying in amount from place to place on the earth's surface, depending upon the local concentration of lead in the soil and water.

3. While most of the "background" body burden of lead is derived from the soil with only a small contribution from airborne lead, man's industrial activities have increased the importance of airborne lead as a contributor to the total lead intake.

Thus lead, unlike most other pollutants, has two significant sources, one natural and one artefactual or man-made. Furthermore, the lead from the natural sources tends to gain entry to the body mainly through the digestive tract with the respiratory system playing a relatively unimportant role as a route of absorption; while in the case of artefactual lead, the lungs assume a much greater significance as a portal of entrance.

4. The lead which is absorbed either through the digestive tract or the respiratory system enters into the body tissues at different rates but for each route the amount absorbed is proportional to the exposure. Thus, the lead levels of samples of blood, bone or certain other tissues reflect the average rate of lead intake from the environment and man may be used as his own sampling system for monitoring the amount of environmental lead which is available for absorption by the body.

Not only is it possible by these means to monitor the lead levels in the present environment but also by measuring the lead content of ancient bones, it is possible to judge the levels of exposure hundreds or thousands of years ago. This is a feature of lead not shared by any other urban pollutant which is of interest at this time.

5. Unlike many other pollutants that may have important effects on the environment as well as

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upon man, lead in the amounts found in ambient air does not cause soiling, corrosion, plant damage or reduce visibility in the atmosphere. As an air pollutant, lead is solely of interest because of its possible effect on human health.

The Nature of Airborne Lead: The major portion of the lead in the atmosphere is in the form of very small particles of inorganic lead salts; there may also exist trace amounts of organic lead vapor.

The inorganic lead particles are derived from two sources and constitute the lead aerosol or particulate. The first source may be termed "natural" because it is not related to man's activities and is composed of:

- silicate dust
- volcanic halogen aerosols
- volcanic silicate smoke
- forest fire smoke
- aerosolic sea salts
- meteoritic and meteoric smoke.²

To these natural sources of lead may be added the radioactive isotope Lead-210 which is present in trace amounts as a result of the decay of Radon and which has been used as a tracer for airborne artefactual lead.³ The chemical and physical identity of the naturally occurring lead in the atmosphere has been little studied and is consequently largely unknown.

The second source of the lead aerosol derives from man's activities. Primary and secondary lead smelters produce mainly oxides of lead while the burning of gasoline containing lead antiknock agents produces complex lead halogen salts. It might be expected that such activities as storage battery manufacture, pigment production, insecticide production, and the burning of waste materials would lead to a wide variety of inorganic lead salts with a considerable range of particle size.

Organic lead occurs in the atmosphere as a result of the evaporation of lead antiknock agents from gasoline. The concentrations present in air are extremely small, averaging in one study 0.078 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) at a period in Los Angeles when the inorganic lead averaged $3.55 \mu\text{g}$ of Pb/ m^3 .⁴ Because the contribution to the total lead of the atmosphere is so small, organic lead will not be further considered in this paper.

While it is apparent that the available information on the chemical nature of the lead aerosol is small, even this amount of information is deceptive since almost all of the information relates to measurements made on the aerosol close to its

source and very little is known of the chemical nature of the lead in the ambient air at a distance from the sources. This is an important point since the chemical nature of the lead plays a major part in determining the degree of its absorption from the lungs or digestive tract. That this is so is reflected in the mining of lead sulfide, a poorly soluble lead salt which has long been known to be less hazardous to the miners' health than more soluble forms of lead^{5,6} while in the Soviet Union this fact has been given official recognition by setting two air quality standards—that for lead sulfide being a little over twice that set for inorganic lead.⁷

That changes do take place in the lead aerosol with time is suggested by studies^{8,9} of its solubility in which the solubility in water has been found to be considerably less than the studies of the chemical nature of the freshly emitted lead would suggest.

Because lead is present in the air in particulate form, the physical characteristics of the lead particle are important in that they determine how much of the inhaled lead aerosol is deposited in the respiratory system. The lead in the ambient air differs from other non-lead particulates in that essentially all of its particles are below 1.0μ in mass median diameter and, therefore, can reach the alveolar spaces of the lung, whereas only about 35% of the non-lead aerosol is in this size range. The ambient lead aerosol is fairly uniform in size, distribution being relatively unaffected by geographical location, local fuel burning practices, prevailing weather conditions, or type of local activity. The size distribution has a mass median equivalent diameter of 0.25μ with 25% of the mass being smaller than 0.16μ and 25% larger than 0.43μ . This information is based on measurements made at 59 urban sites and at two remote sites many miles from any urban settlements.¹⁰ These data are in general agreement with those developed using a different technique for measuring the particle size in which the mass median diameter for lead was found to be 0.18μ with a wide size dispersion.¹¹

Sources of the Lead Aerosol: Emissions of lead may occur from a variety of industrial processes, from the combustion of coal, and the incineration of waste materials. A certain amount of lead may also become airborne from the reentrainment of lead-bearing soils and street dust, although these two sources are considered to be minor contributors to the atmospheric lead level.¹² The main source of lead in the urban environment is the exhaust from automobiles burning gasoline con-

taining lead antiknock agents. Apart from emission inventory studies¹³ that suggest this to be true, the fact that lead concentrations in the air vary with the traffic density, the distance from the highway and the ambient carbon monoxide concentration support this belief.^{14,15}

The Concentration of Lead in the Air: It now becomes necessary to consider the lead concentration of the air and how this has altered in the past and may be expected to alter in the future. As would be expected in considering the huge volume of air overlying the United States, the amount of air sampling that has been done appears small and inadequate and yet enough is known to establish certain principles. Air lead concentrations measured at sampling locations that represent the general environment give average values ranging from 0.3 to 2.5 $\mu\text{g Pb/m}^3$. These values may be regarded as the general background levels of lead in the air upon which are superimposed peak concentrations. These peak concentrations may be related to a particular geographic location such as the area downwind from the stack of a lead smelter or may vary with time at a given location as occurs during the rush hour on city streets. Air samples taken for relatively short periods in or close to traffic show average lead concentrations¹⁶ ranging from 9 $\mu\text{g/m}^3$ to 38 $\mu\text{g/m}^3$ in weekday samples from downtown and freeway routes in Los Angeles and Cincinnati, and from 2.8 $\mu\text{g/m}^3$ to 5.8 $\mu\text{g/m}^3$ for rural roads.

Lead concentrations similar to the background levels reported above for the ambient air have been recorded in urban centers wherever such measurements have been made, both in the United States and abroad. In those few cases where peak concentrations have been measured, these have not been as high as those in Los Angeles where the traffic density is unusually high.

While isolated measurements of air lead values

have some value, the trends of these measurements with time are perhaps even more important. In considering the trend of air lead levels, the amount of valid data is quite meager since even small changes in sampling site may produce significant changes in the measured values and very few sampling sites have remained unchanged over a number of years. In two cities for which data are available, Los Angeles and Cincinnati, a down trend of mean lead levels is evident. In Los Angeles the mean for the period 1954-1955 was 6.6 $\mu\text{g Pb/m}^3$ and for the period 1961-1962 the mean was 4.3 $\mu\text{g/m}^3$. In Cincinnati, making use only of data obtained from fixed, continuous sampling sites, there is a fall in both the central residential and commercial areas over the period from 1946 to 1962, while the peripheral residential levels rose from 1946 to 1951 and then showed a slight drop until 1962.¹³ This information, scanty as it is, runs contrary to what might have been expected from merely considering the increased number of cars and gallons of gasoline sold in the cities in question. A possible explanation of this apparent paradox may lie in the distribution of the lead aerosol with relatively constant lead levels now being established in the core areas of large cities due to traffic saturation, while there is a tendency for a rise toward these levels to occur in peripheral areas. In addition to these factors which would tend to prevent an increase in lead concentration in the center of the city, changes in traffic patterns caused by new freeway construction, methods of home heating, slum clearance projects, etc., could lead to a decrease in air lead levels. Some support for the hypothesis that there has been no general upward trend in lead concentrations in the cities is provided by the data available from the national air sampling network shown in Table I, although it must be noted that the same cities are not necessarily represented each year.

TABLE I
YEARLY AVERAGE AIR LEAD CONCENTRATIONS
U.S. CITIES OVER 100,000 POPULATION IN N.A.S.N.*

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
Average Lead in Air, $\mu\text{g Pb/m}^3$	2.27	1.32	0.61	0.62	0.50	1.40	0.87	1.37	0.99	0.96	0.74
S. D.	1.47	1.02	0.34	0.23	0.36	—	0.53	0.95	0.81	0.42	0.32
Number of Cities	12	19	14	5	24	1	6	11	28	17	20

*From Air Pollution Measurements of the National Air Sampling Network.

Further support for the hypothesis of center-city traffic saturation leading to little or no further rise in some pollutant levels is gained from a projection of future carbon monoxide levels in urban areas.¹⁷ In this report it is projected that carbon monoxide levels will increase in a non-uniform manner. The smallest increases will occur downtown and the greatest increases at the outskirts. Since carbon monoxide levels closely parallel lead levels, a similar effect may be expected in lead levels although other factors such as new freeway construction, changes in housing patterns and alterations in lead emissions make

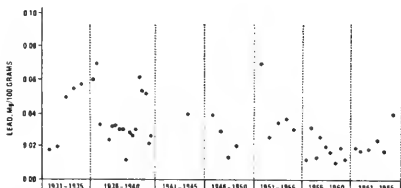


Fig. 1. Lead concentration in Blood "Normal" populations.

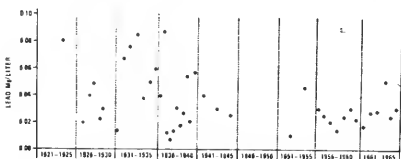


Fig. 2. Lead concentration in Urine "Normal" populations.

any prediction a hazardous matter. In summary, it may be said that from the data available, the lead levels in the atmosphere of our cities have not shown a tendency to rise and in fact in at least two cases have fallen, while a possible rise in the lead concentrations of the suburban areas has not yet been reported but should be looked for by setting up more suburban sampling sites.

Some Biological Implications of the Data on the Lead Aerosol: In considering the possible biological effects of a compound such as lead, it is necessary to know the dose of the compound administered, the route of administration, the duration of the exposure, the chemical and physical nature of the compound and the state of the organism exposed. Changes in any or all of these factors may have an important bearing on the biological effect or lack of effect of the compound on the organism.

Because in contrast to many other pollutants

lead is not destroyed in the body and has a relatively slow rate of excretion, the concentrations of lead in the blood and urine of individuals and of groups of individuals reflect their environmental exposure to lead. Since it has been possible to measure lead with a satisfactory degree of accuracy for many years, it is possible to follow the trends in the lead levels of man over a period of time. In a study¹⁸ of the lead levels in the blood and urine as reported in the world literature, it has been shown that contrary to what might have been expected there is no evidence of an upward trend over the past 30 to 40 years. Figure 1 shows these data for the levels of lead in the blood, while Figure 2 shows the lead concentration reported in the urine.

While it would be most useful if there were earlier data available, the span of time covered in the figures is one of the most important with respect to lead emissions since this is the period during which the volume of lead antiknock agents sold has risen steeply and, therefore, the absolute amount of lead introduced into the urban air has greatly increased. It has been suggested that one reason why the lead levels in the blood and urine have not risen is because absorption of lead from some sources has been falling and has counterbalanced the possible increase from automobile exhaust. The evidence available would suggest that the lead levels from sources other than the air did in fact drop due to improvements in food technology, replacement of lead-containing insecticides by chlorinated hydrocarbons, and the replacement of lead water supply pipes by copper. These changes in the lead levels in the diet largely took place, however, before the period covered in Figures 1 and 2; and it is believed that at least in North America the lead intake from food has not changed appreciably in the past three decades.¹⁹

While the fact that the body burden of lead as represented by the blood and urine lead levels has not changed does not prove it is harmless, it certainly suggests that a stable situation has existed for some time in which lead excretion is balancing the lead intake. Since blood and urine lead levels can only be determined in the living person, to extend the information on the body burden of lead backward in time bone lead determinations must be substituted for those of blood and urine. Recently it has been shown that²⁰ although the lead levels in fossil ice have risen steeply since 1860, the lead levels in bones have shown first a rise and then a fall so that the levels in modern Polish bones are not sig-

nificantly different from those found in bones from the third century.

A further biological implication of the nature of the lead aerosol lies in its physical characteristics. Being made up of fine particles these will deposit in different portions of the respiratory system depending upon their size and will then be subject to various body processes which tend to remove them. In the most complete theoretical treatment of this dynamic process of deposition and clearance of aerosols so far attempted, an international committee has formulated a model which, based on present knowledge, enables the dose of lead actually absorbed from the lungs to be roughly calculated.²¹ Any such model must be used with caution since it rests on a large number of assumptions and approximations, but it may be useful in providing an idea of the amount of lead actually absorbed from the particles of lead in the air since direct experimental measurement of the fraction absorbed is very difficult. Using as input to the model the available information about the physical and chemical nature of the lead aerosol, it can be calculated that about 15% of the inhaled lead aerosol would actually reach the blood compared to an absorption of about ten per cent from lead which is swallowed.

A different approach to the problem of relating air lead levels to blood lead levels has been taken by Goldsmith and Hexter²² who made use of published data to estimate the daily air lead exposure level for groups of persons for whom the average blood lead levels were known. While such a relationship based on rough estimates of average airborne lead exposures in a 24 hour period must necessarily be tentative, it does suggest a tendency for blood lead levels to rise along with air lead levels, although this tendency becomes considerably less marked as the air lead measurements rise above the present range of average values found in the ambient air. The data show considerable variance and some anomalies are apparent when it is compared with some other studies. One such anomaly has been described by Thomas et al²³ who were unable to show a specific effect of living within 25 to 250 feet of a heavily travelled Los Angeles freeway upon the blood lead concentration when this group of persons was compared with other residents of the Los Angeles area exposed to a lower average lead concentration in the air. In another study bearing on this point lead levels in the skulls and ribs of persons dying in Los

Angeles were examined to see whether they correlated with the length of residence in the Los Angeles area with its generally higher lead levels; it might be expected that those who had recently moved to the Los Angeles area would have shown lower lead levels than those who had been residents of that area. No such difference in levels was found, suggesting that other factors such as occupation may quite overshadow an effect due to length of residence. Again these same workers found little correlation of lead levels in bone with age.²⁴

In contrast to these results, other studies have shown that the lead levels in the blood of certain population groups could be ranged in the same order as their presumed exposure to airborne lead.²⁵ In other studies of urban and rural population groups,²⁶ no significant difference was found at the 90% confidence limits between the blood and urine levels of 12 rural population groups compared with urban groups living in the same country. These same workers also found as did another study²⁷ (Table II) that primitive and remote population groups had blood lead levels

TABLE II
LEAD LEVELS IN VARIOUS POPULATIONS¹

Location	Subjects	Mean Pb Conc. mg/100 g Blood
Alpine County, Calif. ²	37	0.013
New Guinea	67	0.013
Philadelphia Suburbs ²	81	0.013
East Africa	63	0.015
Bechuanaland	63	0.017
Peru	39	0.018
Los Angeles Police ³	155	0.021
Cincinnati ³	140	0.023
Marshall Islands	33	0.023
Brazil	11	0.023

Data from:

¹Stopp, G. J.: Discussion presented at American Petroleum Institute Division of Refining Meeting, Los Angeles, May 16, 1967, "Du Pont Company's Investigations into the Health Effects of Lead."

²The Working Group on Lead Contamination: "Survey of Lead in the Atmosphere of Three Urban Communities," U. S. Public Health Service Publication No. 999-AP-12, January 1965 (94 pp.).

similar to and often higher than those found in urban North Americans, although there was no known artefactual introduction of lead into the environment of the primitive peoples. In view of the conflicting data on the relationship of the air lead concentration to blood lead levels in actual population groups, it would appear that while such a relationship can be clearly demonstrated under experimental conditions in the laboratory,^{28,29} the contribution of airborne lead to the

total body burden of man at this time is probably small.

Having considered the information available at this time on the relationship of air to tissue lead levels, it is now appropriate to consider the effects of varying tissue levels of lead on the organism.

Air quality criteria are "tests which permit the determination of the nature and magnitude of the effects of air pollution on man and his environment."³⁰ These criteria are observed results, and depending upon the quality of the experiment performed should be reproducible and relatively free from subjective influences introduced by the observer. The criteria must, however, be evaluated in terms of whether the observed effects are deleterious to human health and it is at this stage in the formulation of an air quality standard that serious disagreement may arise. For instance, the lead level of the body is not actively regulated by man as is the sodium level so that if the lead levels in the environment rise and fall within certain limits, the blood lead level will rise and fall in a similar manner. Some idea of the range of such movement that might be regarded as "normal" can be gained by examining the blood lead levels of persons with no known contact with lead other than that in the diet that they eat. Such a study is shown in Table II. Since these blood lead values do not differ significantly in their range from values recorded for persons living in North America, it would seem reasonable to believe that man may have had blood lead levels in this range for very long periods of time and that they can be considered "normal" in the same sense that a certain concentration of oxygen in the air is regarded as normal and not deleterious to the health of man. It has been suggested³¹ that the first criterion to consider in setting an air quality standard for lead should be an increase in the body burden of lead, but it would seem necessary to qualify this statement by a reference to the normal range of observed lead values and suggest that a rise above an accepted upper limit of normal be the first criterion.

The World Health Organization³⁰ has promulgated four levels of air quality criteria:

"Level I. Concentration and exposure time at or below which, according to present knowledge, neither direct nor indirect effects (including alteration of reflexes or of adaptive or protective reactions) have been observed.

"Level II. Concentrations and exposure times at and above which there is likely to be

irritation of the sensory organs, harmful effects on vegetation, visibility reduction, or other adverse effects on the environment.

"Level III. Concentrations and exposure times at and above which there is likely to be impairment of vital physiological functions or changes that may lead to chronic diseases or shortening of life.

"Level IV. Concentrations and exposure times at and above which there is likely to be acute illness or death in susceptible groups of the population."

But these require some adaptation to suit a pollutant such as lead. Level II would not apply because lead does not cause irritation of the sensory organs, harmful effects on vegetation, or

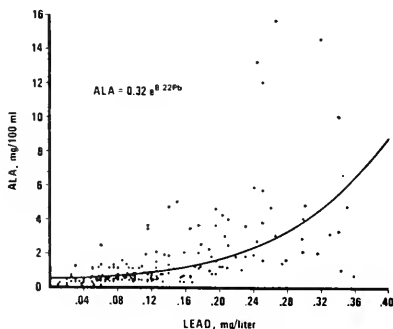


Fig. 3. Total of 193 men exposed to inorganic lead regression: ALA on lead in the urine.

reduction of visibility, while Level III involves impairment of vital physiological function, thus leaving a wide gap between Level I and Level III. To provide a more evenly graded schema, Goldsmith has proposed that a criterion such as interference with metabolism be included in Level II since such an effect would be more important than mere accumulation of lead in the body and less important than an effect such as low-grade anemia.

While the vast literature on the biological effects of lead testify to the many criteria that could be used, time and space dictate that only one or two can be selected for discussion. In doing so, only criteria involving a demonstrated effect of lead in intact human beings have been used since at this time the evaluation of *in vitro* effects in terms of human health is usually impossible. Such observations, for instance as the effect of lead on the red cell membrane,^{32,33} while

important and potentially interesting as criteria should not yet be used as a quantitative index of the effects of lead in the general population.

While attention must be paid to all of the available data on the biologic effects of lead in setting an air quality standard, the criterion that seems most sensitive at this time is the effect of lead on heme synthesis. This effect has the additional merit that measurement of the degree of interference by lead is relatively easy by determining the δ -aminolevulinic acid (ALA) level in the urine.^{34,35} This inhibition by lead is almost specific, not being shared by other heavy metals and the appearance of excessive amounts of ALA in disease states is confined to certain rare porphyrias in which, in contrast to lead, the urinary porphobilinogen level is also raised.³⁶ The level of lead in the urine above which an increased excretion of ALA occurred was 50 $\mu\text{g}/\text{lit}$ as reported by Haeger-Aronsen for lead-exposed workers. In a study carried out by Du Pont's Haskell Laboratory, the relationship in lead-exposed workers between an increasing concentration of lead in the urine and the concentration of ALA is curvilinear (Fig. 3). "Non-lead-exposed" office workers showed no significant change in ALA concentration over the range of urine lead concentrations encountered in the study (Fig. 4).

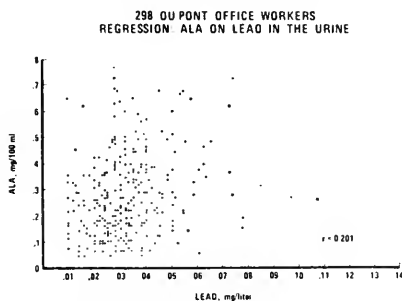


Fig. 4. Total of 298 Du Pont office workers regression: ALA on lead in the urine.

In the range of lead values where the two groups overlap, the ALA values of the lead-exposed group tend to be higher than the office workers. This discrepancy is most reasonably explained by a lag in the return to normal ALA values as the lead levels fall in lead-exposed workers moving from an area of high exposure to one of lesser exposure. Such a delay in the return to normal values has been reported.^{37,38} The same reasoning

probably explains the findings of de Kretser and Waldron³⁹ who reported raised urinary ALA values in workers with urine lead concentrations below the Maximum Allowable Concentration quoted by Elkins⁴⁰ of 200 $\mu\text{g}/\text{lit}$. This finding is probably a further reflection of the fact that a body burden of lead above that regarded as consonant with good industrial hygiene practice continues to affect heme synthesis even after the blood and urine levels have fallen to acceptable values. In the general public, who do not have these high body burdens of lead, the ALA values are not abnormal. The Du Pont office workers showed very similar ALA values to those reported by Haeger-Aronsen³⁸ (Table III).

TABLE III
NORMAL HUMAN URINARY EXCRETION OF ALA
FOR HEALTHY MEN AND WOMEN

	No.	Mean (mg/100 ml)	S.D.	95% Range
Du Pont	302	0.29	0.16	0.00-0.61
Haeger-Aronsen	100	0.29	0.14	0.01-0.57

While a raised ALA excretion is an undoubted result of a sufficiently high body burden of lead, the significance of minor degrees of elevation of ALA excretion in terms of human health remains to be demonstrated. It now becomes important to examine other groups in the population such as traffic policemen and residents close to freeways to see whether they too have normal values of ALA concentration. Such studies will also help to answer one of the most troublesome questions in setting air quality standards which is the problem of unusual susceptibility. How does lead affect different age groups, different sexes, and persons in different states of health?

Susceptible Groups? Of course it is possible to bring forward for discussion any number of hypothetical groups that might be more susceptible to the effects of lead than the general population; but to make such discussions fruitful, there should be some reasonable grounds for believing that the effect claimed is relevant to the actual levels of lead now being absorbed or that might be expected to be absorbed by the population in the future. In the case of women and children, the special concern for the wellbeing of these two groups makes an examination of their susceptibility to lead important. It is necessary however to define what is meant by "more susceptible" before any worthwhile conclusion can be reached. In this paper "more susceptible" is taken to mean that under the same conditions of exposure leading to the absorption of equal

concentrations of lead one population group will exhibit more severe effects, the onset of the effects will be quicker or new, serious effects will appear.

That the child may exhibit more alarming symptoms and face a more grave prognosis when suffering from lead poisoning is true, but what is also true is that the dose of lead which the child ingested is usually many fold greater in proportion to his size than that received by most adults suffering from lead poisoning. The mean daily fecal output of lead by the lead-poisoned children in Chisolm's series (44 mg. Pb/day) exceeded by approximately six-fold that of a group of severely exposed industrial workers (7.6 mg. Pb/day). The group of industrial workers chosen for comparison were exposed to lead-containing dust much of which is swallowed in the saliva. "The more frequent occurrence of encephalopathy in children as compared with adults may depend in part upon their more intense exposure rather than upon any inherent biologic differences between child and adult."⁴¹ The relatively massive lead exposure usually encountered in pediatric practice is not directly relevant to the study of the chronic low level exposure to lead in the community air. During poisoning such as may happen in children ingesting lead paint, the individual dose ingested may be as much as 200 to 300 mg. of lead for flakes of paint weighing two to three Gm., although a more usual dose might be four to five mg. of lead from four to five Gm. of flakes. Since Chisolm found that the minimum exposure period for the development of lead encephalopathy was

lead arsenate from both inhalation of insecticide spray and the consumption of sprayed apples⁴² showed a significant absorption of lead but no indication of any adverse effect on their health (Table IV).

One of the more tragic sequelae of acute lead poisoning in children is irreversible injury to the brain⁴³⁻⁴⁵ and in some of these children, elevated lead levels have been found several years later. The question as to whether the convulsions, mental retardation and behavior disorders all stem from the original acute episode or whether the moderately elevated blood lead level of 60-65 $\mu\text{g}/100\text{ Gm.}$ that are sometimes found after the acute episode plays a part in maintaining the toxicity to the brain is not resolved although the use of chelation therapy should help to answer this problem.

One of the other groups in the population that has been the subject of concern with regard to the possible harmful effects of lead are pregnant women.⁴⁶ In this case there seems to be some evidence in the older literature^{47,48} published at a time when controlled studies were not usually employed that lead does affect both the capacity to conceive and the fetus. Unfortunately, none of these studies give any quantitative measurement of the lead exposure, but from knowledge of conditions at that time⁴⁹ it is known that industrial and personal hygiene was often conducive to severe chronic lead exposure.

Due to the evidence that these bad working conditions contributed to infertility, abortion and

TABLE IV
LEAD LEVELS OF WENATCHEE (WN.) CHILDREN

	Urinary Lead mg./lit			Blood Lead mg./100 g		
	No. Analyses	Average	S.D.	No. Analyses	Average	S.D.
Boys	81	.0529	.0391	17	.0369	.0154
Girls	65	.0545	.0405	14	.0361	.0095

Source: Naef, P. A.; Dreessen, W. C.; Edwards, T. I.; Rainhart, W. H.; Webster, S. H.; Castberg, H. T. and Fairhell, L. T.: Public Health Bulletin No. 267, Washington Government Printing Office, 1941.

of the order of three months, it might, therefore, appear that children are no more sensitive than adults to acute lead poisoning.

Understandably there have been very few studies of children chronically exposed to levels of lead above the population average but short of that producing acute lead poisoning. One of the few such studies is that carried out in Wenatchee, Washington. In this study children exposed to

stillbirths, women in most industrial countries have been prevented by governmental regulations from working in occupations in high lead exposures. Therefore, it is not possible to obtain current data on the effect of lead on women in industry. In one of the few studies in which modern epidemiological methods were used the U. S. Public Health Service, in 1939, studied the fertility of groups of men and women exposed to

lead arsenate insecticide in Wenatchee, Washington. Although the lead levels in the lowest and highest exposure groups were significantly different, there was no detectable effect on their fertility (Table V).

The result of this scarcity of modern data on the effect of lead on human reproduction means that some reliance must be placed on studies using animals. In one of the few such studies so far reported,⁶⁰ workers fed two levels of lead acetate in the diet (64 and 512 mg/kg of diet) to rats from four weeks until one year of age. Four litters of offspring were produced by most of the females during this time. No significant differences were noted in fertility and fecundity between the experimental and control groups. Equal numbers of animals were then taken from the second litters of each group and bred to provide an F₁ generation. Again, no difference was found in the fertility, fecundity, mortality or the ability of dams to rear their young between any of the groups. That the lead in the diet was absorbed is shown by the fact that the average lead content of newborn animals from dams receiving 64 mg. Pb/kg was eight times that in the newborn animals from dams on the control diet.

standard be developed from them? It is obvious that much of the data are conflicting and it is always tempting to retire from the field to await the results of more research. Many eminent men have counseled against this, however, saying that to wait for more research is to wait forever and the problem is here and now. If then we accept the condition of working within the confines of the existing data, those charged with promulgating the regulations must accept the condition that any standard arrived at may need to be changed in the light of new information, and they should be willing to do so.

Since standards to be meaningful must not change too frequently, their basis must be carefully examined by knowledgeable persons in the field from at least two main points of view. First, is it scientifically sound?; and secondly if adopted, can it lead to satisfactory maintenance of air quality? The second point is of particular concern in the case of lead since it has a long biological half life and measures to control lead emissions must necessarily take time to be effective. While the evidence taken as a whole suggests that the body burden of lead is not increasing, this does not mean that it may not in the future. A biolog-

TABLE V
LEAD LEVELS IN WENATCHEE MEN AND WOMEN

LEAD LEVELS IN WORKING MEN AND WOMEN						
Urinary Lead mg/lit				Blood Lead mg/100 g		
	No. Analyses	Average	S.D.	No. Analyses	Average	S.D.
Adult						
Consumers:						
Men	146	.0353	.0215	148	.0263	.0111
Women	123	.0278	.0193	124	.0258	.0095
Adult						
Intermediates:						
Men	102	.0433	.0301	108	.0295	.0110
Women	25	.0274	.0148	27	.0219	.0096
Adult						
Orchardists:						
Men	386	.0883	.0603	329	.0439	.0160
Women	61	.0460	.0249	58	.0344	.0132

Source: Neal, P. A.; Dreesen, W. C.; Edwards, T. I.; Reinhart, W. H.; Webster, S. H.; Castberg, H. T. and Fairhall, L. T.: Public Health Bulletin No. 267, Washington Government Printing Office, 1941.

With the admittedly scanty information available it cannot be denied conclusively that groups of persons may exist who are unusually sensitive to lead in the concentrations now present in the ambient air, but it is also true that such groups have not yet been found.

Proposed Air Quality Standard

Using the criteria mentioned, can an air quality

ical monitoring program must, therefore, be instituted on a regular yearly basis not only for lead but perhaps for other pollutants to provide a series of reference points for the detection of trends. If the trend is found to be upward, then a series of steps should be taken to reduce emissions and such steps must be known to be effective.

There is no evidence that the present body

burdens of lead in the general population are causing any deleterious effect on human health, and furthermore there is no convincing evidence that the present levels of lead in the air exert a significant effect on this body burden. Nevertheless, some persons have expressed a strong sentiment for setting an air quality standard for lead, and indeed two states have already done so. To the extent that an air quality standard set at this time will be based on inadequate and fragmentary data, the sentiment should be resisted. If, however, it is felt that an air quality standard for lead is necessary, then the data upon which a tentative standard should be set would be derived from two main sources.

The first would be the extensive experiments of Kehoe using human volunteers at the Kettering Laboratory and which were summarized in his statement before the Division of Air Pollution Control of the Department of Health of the Commonwealth of Pennsylvania on January 19, 1967. These experiments which are still in progress would lead to a figure of $10 \mu\text{g Pb/m}^3$ as being a conservative level at which to set an air quality standard, and in Kehoe's opinion further information now being obtained may well allow this figure to be raised.

The second source of data upon which an air quality standard can be based is derived from animal studies. Animal studies tend to confirm the human data and suggest that only relatively great increases over presently existing community air lead levels may be expected to have a significant effect on the body burden of lead. In studies conducted by R. F. Lutmer et al.,²⁰ mice were exposed for 15 months to low levels of non-irradiated and irradiated auto exhaust in a cyclic 24-hour pattern. Mouse bone lead concentrations were not significantly affected when compared with control air animals until the 24-hour average atmospheric lead concentration exceeded $9.6 \mu\text{g Pb/m}^3$. The atmospheres containing non-irradiated auto exhaust produced higher bone lead values than did the irradiated exhaust. The irradiated atmosphere more nearly represents the situation in the ambient air.

These studies using mice have a certain built-in safety factor because mice are animals which are constantly grooming themselves by licking their fur. This grooming results in the swallowing of a portion of the lead particulate that inevitably falls out on their coat, while, in addition, mice have a more primitive lung clearance mechanism than do human beings and, thus a greater reten-

tion of the lead aerosol by the lungs would be expected.

Two more theoretical approaches to this problem may be made: the first making use of the Goldsmith-Hexter²² regression line would indicate that at an air level of $10 \mu\text{g/m}^3$ the blood lead value might be about $34 \mu\text{g}/100 \text{ Gm.}$ and this is a figure which is not considered hazardous to health. The second and entirely theoretical approach makes use of the ICRP lung dynamics model.²¹ Using an acceptable daily dose from pulmonary retention of 0.3 mg Pb , the highest acceptable air concentration is calculated from the model to be $18 \mu\text{g/m}^3$.

Taking these admittedly fragmentary and approximate figures, a conservative air quality standard derived for lead would be $10 \mu\text{g/m}^3$ based on a 30-day average. This figure is based solely on health criteria which are considered to embody a considerable safety margin and the $10 \mu\text{g}$ figure is not to be construed as a sharp line between health and disease but a figure which would not lead to any significant, detectable, adverse effect on the population in the present or reasonably foreseeable state of our knowledge. It is recommended that biologic monitoring of representative population groups should be continued to measure the actual level of lead absorption rather than merely relying on the levels of lead in the air. In the case of lead and other materials that behave in a similar biologic manner, biologic monitoring is a more precise indication of the exposure of human beings regardless of the route of absorption or the exact form of the compound. It is also recommended that studies be undertaken of the δ -aminolevulinic acid levels of populations in areas of light and heavy lead exposure since this is one of the most sensitive tests of a lead effect in the intact human being.

Acknowledgments

In the studies on the relationship between urinary lead and ALA values thanks are due to Dr. John Barnes and his staff at Haskell Laboratory for the ALA determinations and to Adrian Lynch and the staff of the industrial hygiene laboratory, Chambers Works, Penns Grove, New Jersey, for the lead analyses. Invaluable assistance was provided by Dr. Mary Maxfield and Martha McLaughlin in compiling and analyzing the data and in conducting literature searches.

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LEAD RESEARCH: CURRENT MEDICAL DEVELOPMENTS

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LEAD RESEARCH: CURRENT MEDICAL DEVELOPMENTS

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At one time the only health consideration of real concern to the lead industry was the ability to mine, smelt, and fabricate lead without causing acute lead poisoning. Due to the dedicated efforts of many people, both inside and outside the industry, we now have the capability to handle lead in the industrial setting with complete safety. This is, of course, no reason for complacency since although the principles of industrial hygiene that allow lead to be handled safely are well understood they are not always applied.

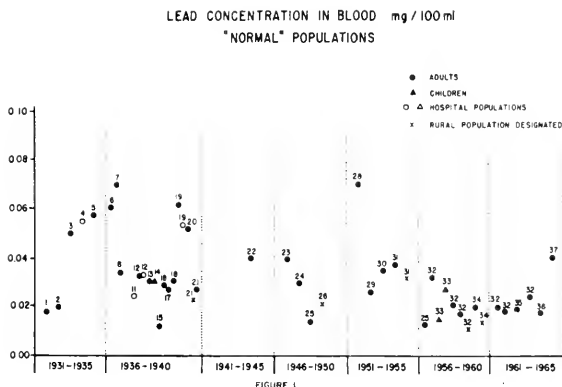
Today the concern of the lead industry with the relationship of lead to health has broadened in its scope to embrace not only the short-term effects of lead but also a strong research program to study long-term exposures to small amounts of lead such as may occur in the general population. In entering into this research program some changes in traditional patterns of thought have been necessary. Ways of thought that were appropriate to the problem of lead poisoning in industry are not always applicable to the problem of long-term low level exposures of the public. Not only must one be concerned with a different level of exposure, but the type of exposure and the persons exposed have altered. Whereas before the concern was with eight hours of exposure per day to healthy persons, now it is necessary to consider exposure levels over a period of 24 hours a day, 365 days a year, and the persons exposed will range from athletes to the acutely and chronically ill. This problem has more in common with the type of exposure that may result from pesticides or radioactive materials than it does with the traditional industrial hygiene problems concerned mainly with the prevention of acute lead poisoning.

In this broadened public health context it is necessary to answer the question, "Is there a significant health threat either now or in the foreseeable future from the lead in our environment?"; and before this main question can be answered, two other questions require elucidation:

1. What are the present levels of lead in human tissues, are they changing and how long have they been at their present levels?
2. What effect, if any, do the present or foreseeable levels of lead have on human health?

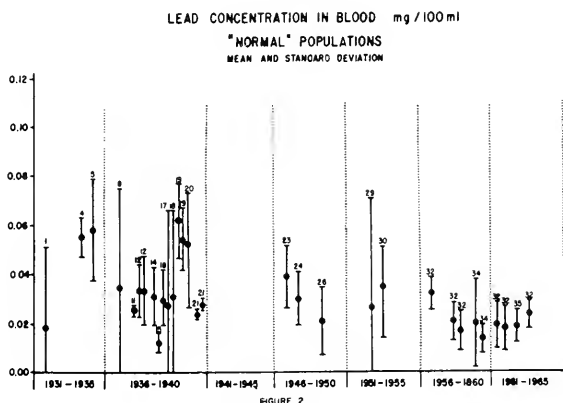
The answers to these two questions are by no means complete, but sufficient data are available to see whether there is cause for concern and perhaps a need for immediate action or whether there is time to gather the remaining data needed for a firm and unequivocal answer.

In attempting to answer the question, "What are the present levels of lead in human tissues and how have they changed over the years?", it quickly becomes apparent that only information on blood and urine lead levels is available in sufficient abundance to make a chronological study possible. Not all of this information is equally useful, for sampling and analytical techniques in the early days were less reliable than they are today and, therefore, some of the results prior to 1938 should be regarded with a certain measure of suspicion.



In Figure 1 each point represents the mean concentration for one set of published blood lead values. The number above each point is the literature reference and by consulting this number in Appendix A further details such as the analytical method used, the number of persons in the sample and the location of the study can be found.

In looking at the general trend of the points in Figure 1 from those in the early days of 1931 to 1940 until the most recent in 1965, there is no suggestion of tendency towards higher blood lead concentrations. Such a tendency might have been expected from the increased volume of automobile traffic that has taken place in the years in question and the introduction of leaded gasoline in the 1920's. Other observations which may be made about Figure 1 are that those populations which are designated as rural tend to have somewhat lower lead values than those reported from urban populations in the same five-year period, and children tend to have levels in the same range as adults in the same geographical area.



LEAD CONCENTRATION IN BLOOD mg/100 ml
 "NORMAL" POPULATIONS
 METHODS OF DETERMINATION

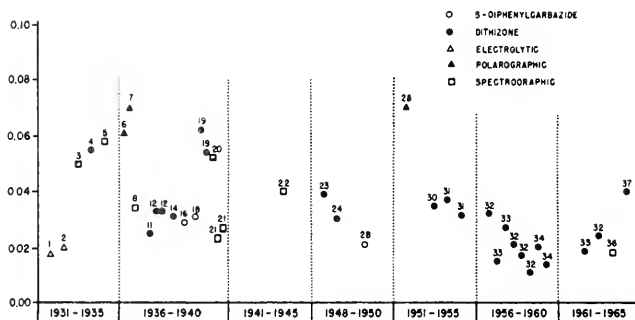


FIGURE 3

Figure 2 gives the mean and standard deviation for each group of lead determinations where these were given in the literature or could be calculated from data contained in the paper. Figure 3 is a portrayal of the methods of analysis correlated with the lead concentration reported.

That the excreted levels of lead in the urine have shown the same general pattern over the years as the blood lead levels can be seen in Figure 4. This chart follows the same format used in presenting the blood lead data, and the references will be found in Appendix B. In many cases the same study is represented in both charts since some investigators studied both urine and blood lead levels. Figure 5 gives the mean and standard deviation for each group of results, and Figure 6 shows the methods of analysis used.

LEAD CONCENTRATION IN URINE mg/liter
 "NORMAL" POPULATIONS

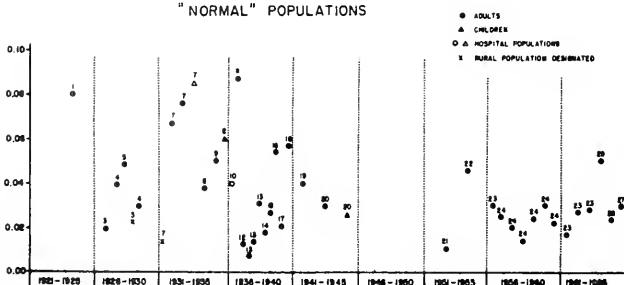


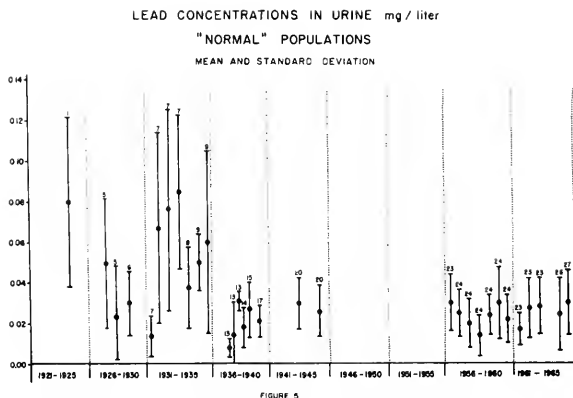
FIGURE 4

The conclusions to be drawn from this survey would seem to be that there has not been an upward trend over the past 30 to 40 years in either the urine or the blood lead levels despite a very large increase in the use of gasoline containing lead antiknock agents.

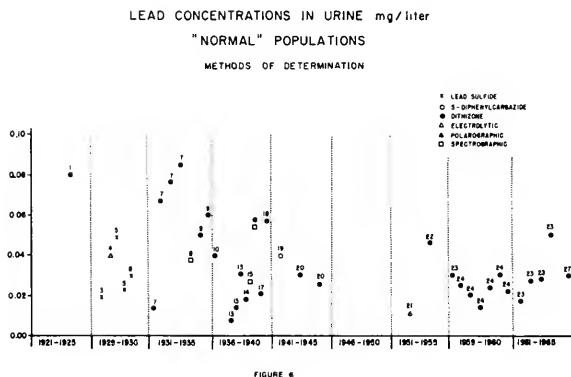
The average blood lead level for the 5,608 subjects represented in the charts from 1955 until the present (1963) was 0.022 mg Pb/100 gm, and the average urine lead level for the same period was 0.026 mg Pb/liter urine. Using these values as reference points it is now of some importance to try to answer the second question propounded earlier as to whether the presently existing levels of lead exert any harmful effect on health. Such a possible effect has sometimes been referred to as a "subclinical" effect and this term has resulted in some confusion. This confusion is due to the need to think about the relationship between lead and health in epidemiological terms as well as in the traditional clinical or bedside terms. In this regard there is a parallel in the relationship between smoking and health and lead and health. If an individual two-pack-a-day smoker is followed throughout his life, he may eventually die of cancer. Taken as an isolated incident there would be no reason to relate his two packs of cigarettes per day to cancer of the lung. Especially is this so since the acute effects of smoking cigarettes (as many small boys can testify) are likely to be nausea, vomiting and extreme giddiness. In fact, the only feature shared between the acute effects of smoking and the possible long-term effects is probably paroxysmal coughing.

Now, if instead of studying one person thousands of smokers are studied and their health compared with that of nonsmokers, a relationship between smoking and health becomes apparent. However, the effect on health is such that it would be extremely difficult to say in any individual case that this man's heart attack or this man's lung cancer was due unquestionably to his smoking habits because heart attacks and cancer of the lung also occur in non-smokers. In looking at the possible effects of lead on long-term health it is this type of epidemiological relationship that must be looked for, and by the use of the term subclinical effect is meant an effect which is believed to be due to lead but which taken alone in a single individual would not allow of a diagnosis of lead poisoning. Such an effect can only be demonstrated by statistical techniques using populations of adequate size.

The employees in the lead industries represent suitable groups for study if an attempt is to be made to seek these "Subclinical" effects of lead. They are suitable for two reasons. First, they presumably share the same basic body burden of lead as do the general population, and to this they add any lead that they may acquire in the course of their work. Thus some of the employees can be expected to have a higher body burden of lead than the general population; and if there is a deleterious effect of lead on health, this group might be expected to show it earlier or in a more obvious form or both. The second reason for looking at an industrial population is that health data may already exist on this group or be fairly readily obtained. This is not so with most population groups where special and often costly health surveys would have to be carried out.



As a pilot project to demonstrate the techniques involved, the tetraethyl lead (TEL) production employees of the Du Pont Company's Chambers Works were selected for study. There are certain drawbacks to using this group of men when the overall objectives of the study are recalled. These objections are firstly that the men are principally exposed to organic lead in the form of TEL. Some handling of metallic lead is required but only a small number of employees could be classified as principally exposed to the metal. The second objection is that the total number of employees is not large when compared with the numbers employed in some smelting and refining processes. Of the two objections, the importance of the first is the more difficult to assess. The clinical picture of acute poisoning due to organic lead is quite different from that of acute poisoning due to inorganic lead, but whether the original form of the lead is of importance over a period of many years is at this time a matter for conjecture. It certainly seems possible that over a long period of time it is the lead ion which is important in any effect on health and not the compound with which the lead was linked when it first entered the body.



Selection of Employee for the Study

The main purpose of this phase of the study was to assess the health status of male wage roll workers now assigned to the TEL area by comparing them to wage roll workers of the same race and of approximately the same age and length of service, but who were never exposed to lead in the TEL area. The study was begun in January, 1965, and included the 348 employees assigned to the TEL area.

The control group was obtained by pairing each TEL worker with a male wage roll employee who had never worked in the TEL area, and who met the following matching criteria:

Race - the same (i. e. , white or non-white)

Age - not greater or less than 3 years plus or minus the age of the TEL worker

Length of Service - not greater or less than 5 years plus or minus the length of service of the TEL worker.

The controls were drawn from a roster of all wage roll employees on the plant, showing each person's name, sex, race, date of birth, and adjusted service date. The selections of controls were made by the following procedure.

A series of 4-digit random numbers were taken from a table of random numbers*. The first 3 digits were used to select a page from the roster, and the fourth digit to select one man from those on the page who satisfied the matching criteria. If no one on the selected page met the criteria, the selection was made from the next page on which there appeared at least one qualified control.

After the controls had been selected, it was discovered, from records in the medical folder, that many controls had been given lead examinations because they were temporarily assigned to the TEL area. Most of these men were laboratory, maintenance, or construction personnel. Because of this exposure other controls had to be substituted. Since so many employees had had exposure in the TEL area, it became more difficult to find employees who satisfied the matching criteria. Therefore, as a compromise, controls were accepted who had had only one lead examination.

If only those workers currently in the TEL area are studied, it can be argued that if lead exposure does adversely affect health, such effects would not be revealed by this group because some lead workers who became ill might have been transferred to other areas. To find out if this kind of bias does exist, the study included the 424 men on the plant who are not now TEL workers, but had been assigned to the TEL area for at least six months at some time in the past.

* Arken, H. and Colton, R. R. Tables for Statisticians, New York: Barnes and Noble, 1950, pp. 142-45

Thus, the subjects of this study consist of these three groups of male wage roll employees.

1. Men assigned to the TEL area as of January, 1965, and who had at least six months of service. This group is referred to hereafter as "Current TEL Workers", or simply as "TEL workers." There are 348 men in this group.

2. Men with no lead exposure in the TEL area paired to each current TEL worker so that each pair is matched according to race, age, and length of service. This group is referred to hereafter as "Controls." There are 348 men in this group.

3. Men not currently assigned to the TEL area, but who were TEL workers for at least six months at some time in the past. This group is referred to hereafter as "Prior TEL Workers." There are 424 men in this group.

That there was a significant difference in lead absorption between the exposed and non-exposed groups is shown by the average urine lead excretion levels for the TEL workers and the controls. The control group having a mean level of 0.03 ± 0.016 mg Pb/liter and the TEL workers a mean level of 0.064 ± 0.033 mg Pb/liter.

Because of the matching process, the age curves of current TEL workers and the controls are almost identical. The median ages of these groups are 48.6 and 47.7 years. In each group, 76 men are non-white.

The prior TEL workers are, on the whole, somewhat younger. Their median age is 42.9 years. Fifty men in this group are non-white.

MATERIAL

The medical records of the 1,120 men in the three groups under study were reviewed and pertinent information transferred to punch cards. The items drawn from the records were as follows:

- history of important chronic disease
- height and weight
- blood pressures
- hemoglobin determinations
- white blood cell counts
- electrocardiographic abnormalities

A chronic disease was included only if there was sufficient indication in the medical records that the diagnosis was firmly established.

FINDINGS

History of chronic disease:

Data on the prevalence of chronic disease are shown in Table 1. For each of the three most common diseases - hypertension, coronary heart disease, and peptic ulcer - the prevalence rate among current TEL workers was significantly lower than that of the controls ($P < 0.02$). Rates among prior TEL workers were also lower than in the control group, but either equal to or greater than the rates among current TEL workers.

For the other diseases, the numbers of cases were rather small, but in no instance was there any suggestion of excessive prevalence among the current or prior TEL workers.

TABLE I
HISTORY OF CHRONIC DISEASE AMONG CURRENT TEL WORKERS
AND THEIR CONTROLS AND AMONG PRIOR TEL WORKERS

	Number			Prevalence Rate (%)		
	Current TEL	Control	Prior TEL	Current TEL	Control	Prior TEL
Total	348	348	424	100.0	100.0	100.0
Hypertension	27	50	38	7.8	14.4	9.0
Coronary heart disease	9	23	11	2.6	6.6	2.6
Peptic ulcer	9	23	23	2.6	6.6	5.4
Chronic nephritis	4	4	0	1.1	1.1	0
Kidney stones	7	6	9	2.0	1.7	2.1
Psychoneurotic disorders	3	6	5	0.9	1.7	1.2
Chronic pulmonary disease	8	7	15	2.3	2.0	3.5
Neurological disease	2	5	3	0.6	1.4	0.7
Diabetes	7	5	7	2.0	1.4	1.7
Gall bladder disease	3	4	6	0.9	1.1	1.4
Cancer	4	3	6	1.1	0.9	1.4
Hyperthyroidism	2	4	3	0.6	1.1	0.7
Cerebrovascular disease	1	3	0	0.3	0.9	0
Cirrhosis of liver	1	1	1	0.3	0.3	0.2
Cataracts	1	1	0	0.3	0.3	0
Hypothyroidism	0	0	1	0	0	0.2

Overweight:

Overweight is defined as 20 percent or more over ideal weight. The ideal weight for a person of a given height is the weight midway in the allowable range for a person of medium frame, as specified in the table of desirable weights issued by the Metropolitan Life Insurance Company.

As shown in Table II, there was little difference between the TEL workers and controls in the proportion of persons 20 percent or more and 30 percent or more over ideal weight.

TABLE II
PREVALENCE OF OVERWEIGHT AMONG TEL WORKERS AND CONTROLS

	Total No.	Percent over ideal weight			
		20 or more		30 or more	
		No.	Percent	No.	Percent
TEL	348	171	49.1	82	23.6
Controls	348	144	41.4	69	19.8

White blood cell count:

Table III shows the proportion of persons whose white blood cell count per cubic millimeter was either less than 6,000 or 13,000 or more on their latest health examination.

TABLE III
PREVALENCE OF HIGH AND LOW WHITE BLOOD
CELL COUNTS* AMONG TEL WORKERS AND CONTROLS

	Total No.	White blood cells (10 ³ /cu. mm.)			
		Less than 6		13 or more	
		No.	Percent	No.	Percent
TEL	348	21	6.0	23	6.6
Controls	348	18	5.2	34	9.8

* Taken on latest examination.

The differences in these percentages between the TEL workers and the control group were small and well within the allowable limits of sampling error.

Electrocardiographic abnormalities:

The electrocardiograms taken on the subjects of the study were reviewed to compare the frequency of abnormalities. The results are shown in Table IV.

TABLE IV
ELECTROCARDIOGRAPHIC ABNORMALITIES AMONG
TEL WORKERS AND CONTROLS

History of ECG Abnormalities	Number		Percent	
	TEL	Control	TEL	Control
All ECG's normal	269	239	89.4	87.9
Myocardial infarction	8	14	2.6	5.1
Arrhythmia	2	2	0.7	0.7
Cor pulmonale	1	0	0.3	0
Other abnormalities	21	17	7.0	6.3
Total with ECG's	301	272	100.0	100.0
No ECG's taken	47	76		
Total	348	348		

All of the tracings were normal for 89.4 percent of the TEL workers and 87.9 percent of the controls. As would be expected from the clinical histories mentioned earlier, evidence of myocardial infarction was more frequent in the control group. For other abnormalities, however, the differences between the two groups were small and not significant.

Hemoglobin:

Table V shows the average hemoglobin concentration for each of the groups by race. Both the TEL groups show slightly lower hemoglobins than the control groups and the non-whites tend to be slightly lower than white employees. Despite the fact that the differences in hemoglobin are so slight, an exhaustive study was carried out in an effort to isolate any factors that correlated with the hemoglobin value.

TABLE V
AVERAGE HEMOGLOBIN CONCENTRATION

	Calculated for	
	All Values (1960-64) grams/100 ml	Subject Mean Values grams/100 ml
TEL workers, white	14.6	14.6
Control workers, white	14.9	14.8
TEL workers, non-white	14.5	14.5
Control workers, non-white	14.9	14.9

None of the factors studied such as seasonal influences on hemoglobin levels, length of service in the TEL area, or urine lead concentration when taken on the same day as the hemoglobin determination showed any correlation with the average hemoglobin value. When yearly averages for urinary lead excretion were studied, there was a slight suggestion of a correlation between the urine lead values averaging over 0.08 mg Pb/liter urine and a tendency to lower hemoglobin values; but there were so few of these high values as not to warrant statistical treatment.

CONCLUSIONS

A study of the data available in the literature does not suggest an upward trend in human blood or urine lead levels over the period of the last 30 - 40 years despite the fact that during this same period the number of cars and the sales of gasoline containing lead antiknock agents has steadily risen.

In a survey of the health of TEL production workers having an average urinary lead excretion more than double that of the general population, no adverse effect on health of this degree of lead exposure was detected. A small difference in average hemoglobin values between the TEL workers and the control group was found and is thought to be due to a few individual employees with average urine lead values of 0.08 mg/liter or above.

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APPENDIX A

In the table below the year of publication has been used where no date for the actual study is given. Where no specific group description is given, the group is assumed to be adults from the general population.

Ref. No.	Year	Lead in Blood		Range	No. of Samples	Method of Analysis	Location of Study	Group Description
		Mean	Standard Deviation					
		mg/100 ml						
1	1932	0.018*	0.033*	0.01 - 0.03	34	electrolytic-colorimetric		
2	1933	0.02		0.01 - 0.05	24	electrolytic-colorimetric		
3	1935	0.05		0.005 - 0.100	200*	spectrographic	Glasgow	hospital population
4	1935	0.055	0.008*	0.04 - 0.07	25	dithizone		
5	1935	0.058	0.021		71	spectrographic	St. Louis, Mo.	medical students
6	1936	0.061		0.041 - 0.079	14	micropolarographic		
7	1936	0.07				polarographic		
8	1936	0.034*	0.041*		89	spectrographic		
9	1937			0.005 - 0.010			Philadelphia	hospital population
10	1937			0.015 - 0.08	148	dithizone		
11	1938	0.025*	0.002		189	dithizone-titrametric	Philadelphia	hospital population
12	1938	0.033*	0.011*		36	dithizone	Philadelphia	adults
12	1938	0.0336*	0.014*		47	dithizone	Philadelphia	hospital population
13	1938	0.031			5		Germany	
14	1938	0.031	0.012		126	dithizone-photometric	Baltimore	children
15	1939	0.012*	0.004*	0.005 - 0.02	22			
21	1939	0.023	0.004		30	spectrographic	Mexico	
21	1939	0.027	0.005		30	spectrographic	United States	
21	1939	0.025	0.005		60	spectrographic		mean of 2 groups above
16	1938-1940	0.0294*	0.0128*		22	diphenylcarbazide	Philadelphia	
17	1940	0.0274*	0.0382*		100		Milan, Italy	
18	1940	0.031*	0.035*		15	diphenylcarbazide		normal pregnant women
19	1940	0.062	0.016*	0.036 - 0.089	20	dithizone	Manchester	
19	1940	0.054	0.013*	0.03 - 0.08	50	dithizone	Glasgow	hospital population
20	1940	0.052*	0.026*		26	spectrographic		medical students
22	1944	0.040		0.005 - 0.12	80	spectrographic	Glasgow	
23	1946	0.0395	0.013*		50	dithizone (Tompaett)	Glasgow	28 normal adults 22 hospital population
24	1948	0.03	0.011*		112	dithizone	Denmark	
25	1948-1950	0.014			19		Switzerland	
26	1949	0.021	0.014	0.0 - 0.0627	150	diphenylcarbazide-colorimetric	Mexico	
27	1953			0.0 - 0.2	244	dithizone-modified mixed color	Japan	urban
28	1954	0.07				polarographic	Prague	
29	1955	0.0261*	0.0468*	0.01 - 0.09	100		Italy	
30	1955	0.0358	0.0157		195	dithizone-monocolor	Zagreb, Yugoslavia	

* Values calculated from data presented.

Lead in Blood (cont'd.)

Ref. No.	Year	Mean mg/100 ml	Standard Deviation	Range	No. of Samples	Method of Analysis	Location of Study	Group Description
31	1955	0.0376		0.022 - 0.067	2000	dithizone- colorimetric	Belgrad	urban
31	1955	0.0315		0.019 - 0.04		dithizone- colorimetric	Yugoslavia	rural
25	1955- 1956	0.013			27		Switzerland	
32	1956	0.032*	0.007*		478	dithizone	Cincinnati	
33	1957	0.015 ^x		0.005 - 0.031	78	dithizone-modified	Philadelphia	infants 5 hr.-6 mo.
33	1957	0.027 ^x		0.003 - 0.054	28	dithizone-modified	Philadelphia	children 6.1 mo.-4 yr.
32	1960	0.021*	0.008*		81	dithizone	Los Angeles	males
32	1960	0.017*	0.008*		93	dithizone	Los Angeles	females
32	1960	0.011*		0.002 - 0.028	37	dithizone	California	rural
34	1960	0.022	0.009		130	dithizone	New Orleans	
34	1960	0.018	0.007		128	dithizone	Dallas	
34	1960	0.019	0.007		131	dithizone	Denver	
34	1960	0.02	0.008		97	dithizone	Chicago	
34	1960	0.02	0.008		112	dithizone	New York	
34	1960	0.02	0.008		137	dithizone	Cincinnati	
34	1960	0.02	0.018*		735	dithizone		urban; mean of 6 above
34	1960	0.014	0.006		162	dithizone		rural
32	1962	0.0196*	0.009*		673		Los Angeles	
32	1962	0.0182*	0.009*		350		Philadelphia	
35	1962	0.0188*	0.007*		10	dithizone,ashed sample	Washington,D.C.	
32	1963	0.024*	0.006*		504	dithizone	Cincinnati	
36	1963	0.0177			47	spectrometric- ashed sample	Pasadena	
37	1963	0.04		0.01 - 0.07	10	dithizone	Istanbul	
38	1963			0.014 - 0.03	200	dithizone		children

* Values calculated from data presented.

^x Median

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Ref. No.	Year	Lead in Urine		No. of Samples	Method of Analysis	Location of Study	Group Description
		Mean	Standard Deviation				
		mg/liter					
1	1925	0.08*	0.042*	25	dithizone		
3	1925-1926	0.02			bisulphite-turbidimetric	Sydney	
4	1929	0.04			electrolytic		
5	1930	0.049	0.032*	35	lead sulphide-colorimetric	London	
5	1930	0.023	0.025*	20	lead sulphide-colorimetric	England	rural
6	1930	0.030	0.016*		Na ₂ S ₂ O ₃ titration		
7	1933	0.0138	0.0105	81	dithizone-colorimetric	Mexico	rural
7	1933	0.067	0.047	44	dithizone-colorimetric	United States	medical students
7	1933	0.076	0.05	44	dithizone-colorimetric	United States	
7	1933	0.085	0.038	36	dithizone-colorimetric	United States	children, hospital population
8	1935	0.038	0.02	77	spectrographic	United States	medical students
9	1935	0.05	0.014*	10	dithizone-micro-colorimetric	Toronto, Canada	adults
9	1935	0.06	0.045*	10	dithizone-micro-colorimetric	Toronto, Canada	children
10	1936	0.04		17	dithizone-photometric		hospital population
11	1936	0.087		16		Australia	office workers, Mt. Isa Mines
12	1936	0.013		8			
13	1937	0.008	0.005*	26	dithizone-colorimetric	India	Hindus
13	1937	0.014	0.017*	17	dithizone-colorimetric	India	Mohammadans
13	1937	0.031	0.005*	10	dithizone-colorimetric	India	Anglo-Indian
14	1938	0.018*	0.010*	11	dithizone-photometric	Chicago	
15	1939	0.02	0.014	34	spectrographic	France	
15	1939	0.022	0.017	30	spectrographic	Mexico	
15	1939	0.020	0.016	30	spectrographic	United States	
15	1939	0.027	0.012	13	spectrographic	Germany	
15	1939	0.027	0.014	107	spectrographic		mean of 4 g above
16	1939	0.054		130	spectrographic		male, white workers

* Values calculated from data presented.

** For reference 2, see reference 5.

Lead in Urine (cont'd.)

Ref. No.	Year	Mean mg./liter	Standard Deviation	Range	No. of Samples	Method of Analysis	Location of Study	Group Description
17	1939	0.021*	0.008*	0.005 - 0.055	102	dithizone	Netherlands	
18	1940	0.057		0.038 - 0.080	10	dithizone	Manchester	
19	1941	0.040		0.0 - 0.100	12	modified Fairhall		office and workers
20	1941	0.0297	0.0134		28	dithizone- photometric	Bethesda	adults
20	1941	0.0261	0.0128		18	dithizone- photometric	Bethesda	children
21	1951- 1953	0.011	0.0005		500	polarographic	Russia	
22	1953	0.046			78	dithizone- mixed color	Japan	urban
23	1956	0.03*	0.014*		478	dithizone	Cincinnati	
24	1960	0.025	0.012		31	dithizone	New Orleans	
24	1960	0.02	0.012		36	dithizone	Dallas	
24	1960	0.014	0.01		33	dithizone	Denver	
24	1960	0.024	0.01		19	dithizone	Chicago	
24	1960	0.03	0.018		13	dithizone	New York	
24	1960	0.022	0.012		31	dithizone	Cincinnati	
23	1962	0.0173*	0.008*		484	dithizone	Los Angeles	
23	1962	0.0277*	0.015*		219	dithizone	Philadelphia	
23	1963	0.028*	0.014*		482	dithizone	Cincinnati	
25	1963	0.05		0.03 - 0.07	10	dithizone- spectro- photometric	Istanbul, Turkey	
26	1963	0.024	0.018	0.0 - 0.064	39		Irkutsk region	
27	1965	0.03	0.016		320	dithizone	Chambers Works, New Jersey	

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Senator Boggs. Our next witness is Dr. James M. Blake, Council on Legislation, American Medical Association.

STATEMENT OF JAMES M. BLAKE, M.D., MEMBER, COUNCIL ON LEGISLATION, AMERICAN MEDICAL ASSOCIATION; ACCOMPANIED BY HARRY N. PETERSON, ATTORNEY, DEPARTMENT OF LEGISLATION, AMERICAN MEDICAL ASSOCIATION

Senator Boggs. We are honored by your appearance this morning, Dr. Blake, and we look forward to your testimony.

Dr. BLAKE. Thank you, Mr. Chairman.

Mr. Chairman and members of the subcommittee:

I am Dr. James M. Blake, a physician in the practice of medicine in Schenectady, New York, and my speciality is diseases of the chest. I am a member of the American Medical Association's Council on Legislation, and am pleased to appear here today to present the Association's views on legislation before you concerning control of air pollution. With me is Mr. Harry N. Peterson, an attorney in the Department of Legislation.

Mr. Chairman, air pollution is increasingly becoming one of our most serious health problems. For too long we have taken for granted the atmosphere, one of our natural resources; it is time now to look upon this resource as one on which the survival of man depends.

In recent years, the country has awakened to the need to control air pollution. Yet, more and more, our air becomes polluted and hazards to health increase. We must take stronger action to reverse this direction—stronger action than we have taken in the past.

The legislation before you, in extending the Clean Air Act, provides for intensified efforts in research, setting stricter emission standards and broadening their application, as well as strengthening enforcement procedures. We support these objectives.

Since 1955, the American Medical Association has supported Federal research and development programs in which State and local governments would assume the basic responsibility for preventing and controlling air pollution. The Association has continually stressed the need for maximum feasible reduction of all forms of air pollution, including particulates, gases, toxicants, irritants, smog formers, and other biologically and chemically active pollutants.

In view of the expanded seriousness of the problem of automotive emissions, the AMA has favored national standards for their control. This policy has been followed in recognition of the fact that automobiles are designed, manufactured, and distributed on a national basis, and move continually across state lines. Requirements which might vary among the States and jurisdictions would only add to the cost and confusion of control procedures.

In 1967, the Association gave its support to the Air Quality Act of 1967, which substantially expanded and strengthened the Nation's program against air pollution. That Act authorized the Department of Health, Education, and Welfare to conduct research and other programs towards the development of improved low-cost techniques for the control of combustion by-products of fuels and for the removal of potential pollutants from fuels, and contained other provisions

which would assure the adequacy of systems or devices in motor vehicles for the control of emissions. The Association also supported the provisions creating regional air quality commissions in those instances where air pollution would endanger the public health and where existing control mechanisms were shown to be inadequate. We stated that the designation of regions, as provided in the Act, should bring about more effective measures for controlling pollution, especially since HEW would establish criteria for ambient air quality and would recommend control techniques.

Last December, the AMA House of Delegates directed the Association to intensify its efforts in promoting environmental health. Medical societies were requested to assist and advise private and governmental agencies; to encourage physicians to serve on appropriate advisory and policy boards; and in concert with others, to develop adequate criteria for the solution and prevention of environmental problems.

Mr. Chairman, it is imperative that all elements of our society join to overcome the increasing pollution of our atmosphere. Measures which a few years ago were deemed adequate to meet the needs simply have not achieved the desired goals. New steps must be taken if we are to make any substantial headway in alleviating the problem. Accordingly, we believe that it is now necessary to provide for additional pollution controls and to make the essential financial commitment. We are aware that the public similarly recognizes the seriousness of the problem and expects remedial action.

As we have indicated, we support the provisions of the bills before you extending the Clean Air Act and continuing the various research programs. In addition, we also believe that the provisions of S. 3466, authorizing the Secretary to set standards, both as to ambient air quality and as to emissions from stationary sources, should be supported. The authorization to the Secretary to set air quality standards for the Nation would simplify the current standard-setting procedures, expedite the development and implementation of standards and provide uniformity. By this impetus, States could move rapidly in their plans for implementation and enforcement. Since the cooperation of industry and the public is essential to any effective program, we suggest that the standard-setting procedures include opportunity for the participation by these groups in their development.

S. 3466 also provides that the Secretary would, by regulation, giving appropriate consideration to technical feasibility, establish standards with respect to emissions from classes or types of stationary sources which (1) contribute substantially to endangerment of the public health or welfare and (2) can be prevented or substantially reduced. These standards would be established only after reasonable notice and opportunity for interested parties to present their views at a public hearing. Authorizing the Secretary to set emission standards for stationary sources, under these requirements, appears warranted and should be supported.

S. 3229 and S. 3466 would extend for 3 years the general authorization of appropriations as well as special authorization for research relating to fuels and vehicles. In addition, S. 3229 would expand research to develop low emission alternatives to the internal

combustion engine. We have consistently supported research activities directed to the control or removal of pollutants. Accordingly, we support these proposals.

S. 3229 would amend Title II of the Clean Air Act to extend the national emissions standards authority of the Secretary of HEW to vessels, aircraft and commercial vehicles, where pollution from these sources endangers the health or welfare of individuals. The AMA supported the original enactment authorizing emission standards for motor vehicles. As applicable to motor vehicles, the Secretary shall give appropriate consideration to technological and economic costs, in setting standards applicable to watercraft, aircraft and other vehicles. We support these provisions.

Mr. Chairman, before closing, I would assure this committee and the Congress of our wholehearted support for such action which would reduce, or even hopefully eliminate, the problem of air pollution. In our own organization, the mission of the AMA Council on Environmental and Public Health is to identify, develop, and promote medicine's role in environmental and public health affairs. Attention is focused on human health hazards and the medical implications resulting from environmental pollution. Preventive and corrective measures are stressed. In a variety of ways, continuing programs are conducted to educate and motivate physicians, to support medical societies in their efforts, and to inform the public.

The American Medical Association has sponsored annual AMA Congresses which call together all persons in the nation who work or have a special interest in environmental health. At the first Congress, attention was focused on air and water pollution, pesticides, and radiological health. The 1969 AMA Congress featured a subject gaining new recognition as a health hazard—noise pollution—with discussions centering on the impact of noise on emotional and physical health. The forthcoming 1970 Congress on May 4–5 in Washington, D.C., will feature the population growth problem and its relationship to health. Many informed sources, incidentally, believe that the expanding population is at the center of our pollution problems.

The American Medical Association also sponsors biennial Air Pollution Medical Research Conferences—this year's is scheduled for October in New Orleans. The purpose of these conferences is (a) to encourage scientific investigation of the effects of air pollution on health; (b) to critically examine the present status, needs and goals in air pollution measurements to achieve better correlation of physical, chemical, and biomedical data; and (c) to present original research findings and to explore application of these findings to medical care and control efforts.

Mr. Chairman, let me again express our pleasure for the opportunity of presenting the American Medical Association's views on this important legislative issue. We will now be pleased to attempt to answer any questions the committee may have.

Senator Boggs. Thank you, Dr. Blake. You are very kind to be here today. Your statement is excellent, and it will be very helpful to the committee. I want to again commend the American Medical Association for its continued assistance to this committee and the Congress since we began working on legislation for the control of air pollution.

Dr. BLAKE. Thank you.

Senator Boggs. You mentioned research efforts in the field. The air quality criteria for particulates and sulfur oxide give consideration to chronic, long-term exposures. Do you have any particular recommendation regarding possible legislation to stimulate research in this area?

Dr. BLAKE. Obviously, the major recommendation in reference to research is the fiscal need. In most of our medical research programs we are greatly in need of additional funds. This applies not only to the national institutes but the various schools across the country doing research at these various levels.

Senator Boggs. You might wish to add to that comment if I ask you this question along the same line.

Has the American Medical Association made any particular attempt to evaluate current Federal research programs in environmental health?

Dr. BLAKE. I can't give you the exact details on that, except that I know that our Council on Environmental Health that I referred to is constantly alert to the programs that are going on.

I feel quite confident they are familiar with the various research programs.

Senator Boggs. I see you have an associate with you. I would be glad to have his comments.

Mr. PETERSON. Mr. Chairman, I am an attorney in the Department of Legislation, so I can't answer you on a technical basis.

But I wanted to refer to the written statement and call your attention to page six, where it indicates that the Association will sponsor the biennial Air Pollution Medical Research Conference.

This question of research into these areas is the very subject on which you are talking.

Senator Boggs. That promoted the question. That is good and I commend you for it.

Mr. PETERSON. The purpose of this conference would be to encourage the investigation of the effects of air pollution on health.

I imagine the entire research program will be evaluated at this conference.

Senator Boggs. Do you believe that the present system of regional air quality standards, based on Federal criteria, has been inadequate?

Dr. BLAKE. We feel that it hasn't accomplished the purpose or that it has not accomplished it rapidly enough.

As I mentioned in the statement, we feel that the Federal standards would be more effective in this respect.

Senator Boggs. I noticed that in your statement. But I wanted to get back to regional air quality standards. I judge from what you say that you don't think regional standards have been inadequate, but you think the effort can be strengthened with national standards.

Dr. BLAKE. Yes.

Senator Boggs. The standards on a regional basis have been set in about 29 regions at the moment. I think this is considerable progress in the short time that is involved. It is an excellent start, actually.

Doctor, do you, as a physician, have any thoughts on the health aspects of leaded gasoline. You heard the previous witness. Do you have any testimony you care to present on that subject?

Dr. BLAKE. I cannot give you specific data in reference to that because it is truly not readily available, as was mentioned.

Our concern, of course, is the effect of any element that might be hazardous as far as health is concerned in relation to pollution and the health of the people as a whole.

Lead, itself, is a toxic material. We do not know the effect from exhaust. As was mentioned in the previous testimony, there is some difference between city dwellers and rural dwellers in relation to lead levels.

We know the source of this in some respects. But I cannot be specific other than to point out to you, Senator, that we do not know what the slow and cumulative effect might be over a period of years.

This is the point of investigation which is of some significance.

Senator Boggs. I have no further questions at this time, Doctor.

We thank you very much for your appearance today. We value your testimony greatly.

Dr. BLAKE. Thank you.

Senator Boggs. Our next witness is Mr. Richard C. Glogau, Senior Vice President, Engelhard Minerals & Chemicals Corporation.

**STATEMENT OF RICHARD C. GLOGAU, SENIOR VICE PRESIDENT,
ENGELHARD MINERALS & CHEMICALS CORP., AND EXECUTIVE
VICE PRESIDENT, ENGELHARD INDUSTRIES DIVISION**

Senator Boggs. We are glad to have you with us, Mr. Glogau.

Mr. GLOGAU. Mr. Chairman and members of the committee:

My name is Richard C. Glogau and I am a Senior Vice President of Engelhard Minerals & Chemical Corporation and Executive Vice President of the Engelhard Industries Division of that corporation.

The Engelhard Industries Division is a major manufacturer of precious metal catalysts for the chemical, petrochemical and petroleum industries.

Our petroleum catalysts and processes are installed in approximately 25 percent of the free world's petroleum reforming units.

We also are one of the two major domestic platinum refiners. Engelhard occupies a unique position being both a major refiner and supplier of platinum metals to industry and a major producer of platinum metals products.

We have a sizeable research division, much of whose work is devoted to the catalytic properties of the precious metals, especially the platinum metals, and their application in industry.

I am giving you this background, so that you will understand our capability in this field.

My testimony will be directed to the steps which can be taken under the present state of the art which will have a significant effect on decreasing air pollution caused by automotive exhaust.

And this bears on a point which ought to be made at these hearings. If it has been made, it will bear repeating. That is simply this: When this subcommittee focuses on automotive air pollution, as it has done so productively, it focuses on the segment of our environment which gives promise of early results at relatively low cost.

The internal combustion engine accounts for at least 50 percent of the Nation's air pollution. Some experts put the estimate as high as 65 or 70 percent.

In urban areas, some say 90 percent of the air pollution comes from cars, buses and trucks.

The question of what to do about solving this problem has been tackled from many different directions and while some progress has been made it is obvious that an adequate solution has not been developed.

In our view, the problem logically divides itself into two parts:

1. The elimination of lead compounds from automotive fuels.
2. The treatment of exhaust emission.

Both of these, we feel, must go together.

There has been a rather prolonged debate about the economic feasibility of removing lead from automotive fuels. The automotive industry now says engines requiring lower octane fuels will be available in the near future.

Under this circumstance, we believe the petroleum industry, using advanced refining techniques, can achieve the goal of producing lead-free fuel at a cost commensurate with the benefit obtained.

The technology for accomplishing this has been materially advanced in the last year or two by new process technology and by the development of reforming catalysts having much higher stability.

These permit the production of higher octane fuel, while minimizing capital expenditures required to obtain the additional reformate required to increase the octane number of unleaded fuel.

Some questions have been raised as to the adequacy of precious metal supplies to implement such a program. We have examined this question carefully, and are quite certain that required supplies of precious metals and catalysts can, and will be made available for this program as it develops.

It is obvious, of course, that the goal of removing lead from automotive fuel provides a primary benefit in that it eliminates the 500 million pounds of lead which is currently being emitted from the exhaust pipe of the Nation's automotive fleet.

The second benefit, however, is in our judgment even more important. This is that it makes this job of cleaning up the exhaust emission much simpler by the use of catalytic devices of demonstrated capability.

For the past five to six years we have had on the market a catalytic device for use on internal combustion engines utilizing unleaded fuels. This device called a PTX Purifier has a demonstrated life of thousands of hours and has been tested in a variety of hard service conditions.

The State of California has certified this device for use in conjunction with liquid propane-fueled vehicles following exhaustive test procedures conducted under the supervision of the California Air Resources Board.

Just for the record, I have here the device I am talking about.

Although, as previously noted, this device has not been used on automobiles, because the lead component of ordinary fuel poisons the catalysts, we have made tests on standard cars using unleaded fuel to determine the efficiency and life of the unit.

A typical result obtained under the California test conditions is as follows:

	Hydrocarbons gr/mile	CO gr/ mile
PTX purifier.....	0.30	1.7
Proposed Federal standards:		
1975.....	.60	11.5
1980.....	.25	4.7

In other words, this device as it now stands will meet the proposed 1980 standards as long as it is used on unleaded fuel.

While much more test data has been developed, the above is cited only to give the committee an indication of the type of performance that is now available from catalytic devices which are commercially in use on vehicles using unleaded fuels. Road tests of cars using this device have indicated that a life of 100,000 miles is not impossible.

While the PTX unit in its present form does not solve the oxides of nitrogen problem, recent laboratory work indicates that there are various combinations of this unit which, with other types of catalysts, will effectively control nitrogen oxide mission.

However, with these devices it is still imperative that they operate in a lead-free environment.

There is a great deal of work going on in many laboratories looking toward the best solution for dealing with the problem of air pollution caused by automotive exhaust.

To try and predict what the best solution is at this juncture, I think, would be most unwise.

However, I think certain generalizations can be made that will be of help to the committee in its deliberation.

(a) Removing lead compounds from gasoline as speedily as possible is highly desirable on two counts:

(1) Decreased contamination of the atmosphere by lead is beneficial per se.

(2) The elimination of lead makes the use of catalytic devices already developed a complete feasibility.

Other devices under development are not compatible with lead, either.

(b) The technology and commercial resources for accomplishing the above programs are available.

(c) The implementation of the program to produce unleaded gasoline will require increased quantities of precious metals, particularly platinum. These quantities will be available as needed.

(d) The use of precious metal catalytic devices seems to be very attractive from the standpoint of the technology and the economics involved.

The quantities of platinum involved in this use are admittedly greater by an order of magnitude than those required in the program to supply unleaded gasoline.

Adequate known reserves of platinum have been developed and, with proper planning, these supplies can be made available for use in the production of catalytic devices.

Mr. Chairman, and members of the committee, I would like to express my thanks for the opportunity to bring these views on a very complex problem to your attention.

It is extremely important for all of us that steps be taken to reverse the path in environmental pollution down which we have been drifting, and I would like to commend the committee for its dedication to that cause.

I shall, of course, be glad to answer any questions within my competence.

Senator Boggs. Thank you very much. We appreciate your being here and we thank you for your excellent statement.

I am curious, why do you have to use platinum? Would you explain that to me?

Mr. GLOGAU. I don't know that it is necessarily true that platinum has to be used. It just happens that platinum is a very efficient catalytic material, and because of our competence in this area we have examined platinum more extensively than other materials. There are other non-precious metal catalysts that also hold promise.

Using platinum as the catalyst, this device here in my hand is about the size that would be used in an ordinary automobile. If you go to non-precious metal catalysts, these also will work, but will not function in a leaded environment and the size of the device becomes much greater and it poses a more complicated problem as far as the automobile is concerned.

Senator BOGGS. Does that one contain platinum?

Mr. GLOGAU. This is simply the device itself. It contains a honeycomb insert which has a relatively small amount of platinum in it. Here in my hand is the catalyst itself.

Senator BOGGS. I thought it would have a lot more platinum.

Mr. GLOGAU. We would have to have more guards with us if it were platinum.

Senator BOGGS. How much platinum would it require to put a catalytic device on every car in America?

Mr. GLOGAU. I don't think we know yet exactly how much platinum it will take. We have made experimental runs using less than 0.05 ounces of platinum.

So you are talking about something perhaps in the order of 4 million to 5 million ounces of platinum if you put these devices on every automobile in the country.

Senator BOGGS. I am not familiar with how much platinum exists in the world, but it is in short supply, isn't it?

Mr. GLOGAU. Platinum currently is in relatively short supply, but there exist known reserves of platinum in excess of 200 million ounces.

Of course, the one thing about platinum which makes it an attractive material to use catalytically is that it is used over and over again.

One of its main uses is in the production of nitric acids and all of that platinum is recycled.

In the petroleum field, the platinum used in the reforming process all comes back through recycling. So it is not a material that is lost.

Senator BOGGS. Have you made any attempt to evaluate the feasibility of recovering platinum from the catalyst during disposal?

Mr. GLOGAU. Yes, sir. This is a perfectly feasible thing.

Senator BOGGS. You would do that?

Mr. GLOGAU. We would do that.

Senator BOGGS. Senator Baker?

Senator BAKER. How much does an ounce of platinum cost?

Mr. GLOGAU. About \$130.

Senator BAKER. So you are talking about how much?

Mr. GLOGAU. We are talking about \$6.50 worth of platinum per automobile, in that neighborhood.

Senator BAKER. That would be the total cost of the platinum and it is recoverable?

Mr. GLOGAU. And that is recoverable.

Senator BAKER. So it is really a very small amount.

Mr. GLOGAU. The cost of the platinum in these devices would not be a significant item. If you look at the cost that has been estimated for other emission control devices, the cost in this device is minimal.

Senator BAKER. How much is the unit, including the platinum?

Mr. GLOGAU. We have made these devices and I think we have some 6,000 of them out for use in trucks and that sort of thing. As you can see, it has been more or less a nonproduction line device because it has been especially fitted to each application.

It would be our feeling that this device probably could be made for something on the order of \$50.

Senator BAKER. What do you think it would cost to recycle? Say you run 100,000 miles or some sort, and you still have the car or somebody else has the car. Do they send that back?

Mr. GLOGAU. They send it back and we recover the catalyst. It would be simply like replacing the oil filter in your automobile. Actually, what would probably be done is simply to replace the catalyst unit itself.

Senator BAKER. Is it possible to build that as part of the manifold system at a substantial reduction in price?

Mr. GLOGAU. Actually, in our view, this would be the best place to put it, as close to the exhaust manifold as possible. It would not be a muffler in the commonly accepted sense.

Senator BAKER. Actually, it would be more efficient if you put it right at the manifold system as part of the manifold system.

Mr. GLOGAU. Yes.

Senator BAKER. Is there any reason the automobile manufacturers couldn't do that?

Mr. GLOGAU. None at all. I think in the discussions we have had with the automotive people their main concern is, for some reason or another, that the word "platinum" scares everybody. I can understand this.

We are trying to establish the fact that if we were talking about material that was not as exotic sounding as this, I think we would be a lot further down the road with this development.

Senator BAKER. You made reference to the use of this catalytic system for propane gas, which, as I understand it, has a much lower emission level than gasoline—am I correct in my recollection?

Mr. GLOGAU. The kinetics of reaction of propane are different than in motor fuels.

Senator BAKER. So the exhaust in propane is inherently less in emissions?

Mr. GLOGAU. That is correct.

Senator BAKER. Can you tell us what sort of emission levels you got on propane with your catalytic device?

Mr. GLOGAU. Well, the levels are substantially below this.

Senator BAKER. Are they below 1980 goals?

Mr. GLOGAU. They are below the 1980 code levels, yes.

Senator BAKER. Are they further below than gasoline?

Mr. GLOGAU. As I recall these levels, they are down to perhaps half of the 1980 levels that I indicated here on gasoline.

My able assistant has just handed me some figures. Actually, in terms of the CO percent we are down below 6/1000 of one percent in CO, and in hydrocarbons down in the order of 50 parts per million. One of the reasons this was developed—

Senator BAKER. You are still talking about propane?

Mr. GLOGAU. Yes, this is propane. The reason this was developed for use in these trucks was in areas, for instance, of underground mines or relatively very tight space where the CO levels, in particular, had to be very tightly controlled.

Senator BAKER. You could get even better results from using liquified natural gas, wouldn't you?

Mr. GLOGAU. Yes, you probably would, though we have never done this. Most of the liquified gas for use in these trucks hasn't come into common use.

Senator BAKER. What other minerals could we use?

Mr. GLOGAU. Compounds of copper, chromium and vanadium have shown some promise.

Again, if you do not limit the quantity of catalyst required, there have been some results that indicate that you can do a reasonable cleanup job with some of the non-precious metals.

Senator BAKER. Would the use of copper, in view of your statement that it requires much more and larger units, be cheaper than the use of platinum?

Mr. GLOGAU. I think there is some work that has to be done in this. If I were having to predict how the system would go, I think eventually you would wind up with a two-phase system. We still have the NO problem to deal with. This has to be done, I think, in a two-phase system.

The copper chromites show some promise in this situation so you actually might end up with a two-stage system, one part precious metal and one part base metal.

Senator BAKER. You spoke of unleaded gasoline and lower compression. There is one unleaded gasoline on the market now.

Mr. GLOGAU. That is correct.

Senator BAKER. Is it a high octane gas?

Mr. GLOGAU. It is high octane.

Senator BAKER. Is it as high as the leaded gasolines?

Mr. GLOGAU. Yes. It is 100 octane.

Senator BAKER. Why must there be any reduction in compression ratios or octane ratings if we have the technology to produce this unleaded gasoline at high octanes?

Mr. GLOGAU. Let me say I am not an expert in the petroleum field; but if you take what the petroleum industry calls their so-called "clear pool of gasoline," gasoline before it has had any lead treatment, across the board this is divided into two categories: Their so-called regular clear pool running about 88 octane, and they raise this up to around 96 octane by adding lead.

Then their premium grade clear pool runs around 96 or thereabouts and they raise this up to the required premium level by adding lead to it.

Theoretically and technically, if you started out to redesign the whole petroleum industry, you could produce gasoline to meet these requirements by revamping the whole refinery system, bringing in more alkylation in the front end and more reforming capacity at the back end, and so on.

This will take some time to do, but from the pure standpoint of technology, this could be done.

Senator BAKER. But you could make unleaded high octane gas?

Mr. GLOGAU. You could make unleaded high octane gasoline, without question. It is being done.

Senator BAKER. On the testimony we had this morning from Du Pont on their thermal reactor, is there any intrinsic reason why your concept of catalytic recovery and theirs of thermal recovery couldn't be combined?

If so, wouldn't that offer some problems for reducing the cost?

Mr. GLOGAU. The Du Pont device, of course, has just been recently announced. I think I saw some figures somewhere where they said they were estimating the cost somewhere around \$150 or \$300 for the device.

I can't really answer the question of how these two devices would be combined.

It may well be that the ultimate solution to this situation is a combination of a catalytic and a thermal reactor.

It may well be from what we have seen the thermal reactor combined with careful control of the air mixture ratio in the engine is the way you handle the NO problem and then clean up the remaining CO and hydrocarbon content with the catalytic device.

This whole system is in a state of flux. There was some comment made about whether taking lead out isn't significant as far as health is concerned.

I would like to call the committee's attention to an article in the Chemical and Engineering News, which is the official organ of the American Chemical Society, on March 9, 1970.

I hadn't intended to put this in, but this is a brief resume of an article from Scripps Institute in which they have made a very exhaustive survey of the effect of lead in the atmosphere.

Let me read a couple of paragraphs.

A long-term increasing trend of lead content in the air is observed compared with 1957 and 1965 data. Geographically, there is a logarithmic increase of atmospheric lead contents during temperature inversion phenomena.

Lead content of downtown San Diego air approaches 8 micrograms per cubic meter of air, nearly that of the tentative national air quality limit.

In other words, he is saying the maximum exposure for an individual working in an environment is something around 10 micrograms per cubic meter and we are approaching this level as a result of automotive pollution alone.

In reading through this article, it is difficult for me to really see that taking lead out of gasoline, per se, is not in the interest of cleaning up the environment.

Senator BAKER. Thank you.

Thank you, Mr. Chairman.

Senator BOGGS. Is any platinum released to the environment from this device?

Mr. GLOGAU. No, sir. Platinum is a very, very nonvolatile compound. That is one of the reasons why it is a stable catalyst.

Senator BOGGS. You heard the statements earlier this morning, I imagine, that the removal of lead from gasoline may prove harmful in use in older cars, and that the thermal reactor effectively meets the 1975 standards using leaded gasoline. Do you have any comment?

Mr. GLOGAU. It is quite true that if you take the lead out of gasoline and increase the octane member by further refining, the aromatic

compounds are increased. But if you treat the emission from these cars and reduce the hydrocarbon level to established standards, whether there are aromatics in the gasoline or no aromatics really has no bearing on the question because once you achieve the hydrocarbon level the aromatics have been eliminated.

Senator BOGGS. Which your device would reduce?

Mr. GLOGAU. Yes.

Senator BOGGS. How many miles of travel would your device undergo before it needs servicing or replacement?

Mr. GLOGAU. We have checked it out and so far it has undergone at least 100,000 miles and it is still operating.

Senator BOGGS. Is the cost of reservicing or replacing expensive?

Mr. GLOGAU. We think it would be really not much more expensive than having your oil filter changed.

As we visualize, it would be a matter of simply putting in the catalyst.

Senator BOGGS. I appreciate your being here this morning. I have on further questions at this time. We value your testimony. Thank you very much.

Mr. GLOGAU. Thank you, sir.

Senator BOGGS. We have one additional witness this morning, Mr. Willard F. Bixby, Vice Chairman, Air Quality Committee, Manufacturing Chemists Association.

STATEMENT OF DR. WILLARD F. BIXBY, VICE CHAIRMAN, AIR QUALITY COMMITTEE, MANUFACTURING CHEMISTS ASSOCIATION, ACCOMPANIED BY DR. KENNETH D. JOHNSON, STAFF ENGINEER

Senator BOGGS. Thank you very much for being with us today.

Mr. BIXBY. Mr. Chairman and members of the subcommittee:

My name is Willard F. Bixby. I am appearing as a witness on behalf of the Manufacturing Chemists Association (MCA), a nonprofit trade association with 175 United States company members, representing more than 90 percent of the production capacity of basic industrial chemicals within the country.

I am professionally employed by a major chemical company as design manager of its processes and equipment for the control of air and water pollution, and am currently serving as vice chairman of the MCA Air Quality Committee.

I am accompanied by Dr. Kenneth D. Johnson, staff engineer for the Association's air quality program.

There is always a danger that, in commenting on pending legislation, objections we may express to specific phraseology or administrative provisions may leave with the listeners an impression that we oppose the goals fostered by the authors of that legislation. Let me assure you, gentlemen, that such is not our intention today.

The chemical industry, both in its Association activities and through the public pronouncements of the officers of its leading members, long ago placed itself on record as recognizing the need to protect our environmental resources and to repair the results of past neglect.

The suggestions we offer here are made in the sincere hope that they

well help in finding efficient and effective legislative routes toward these ends.

As the problem of restoring balance to our ecology becomes more fully revealed in its awesome dimensions, the need for efficiency and maximum effectiveness in each of our pollution abatement moves becomes more clearly evident.

Our Nation cannot afford to dissipate our critical resources of talent, time and capital on control strategies that are ineffective in truly improving the quality of our environment.

Many believe that industry is opposed to "strict" air pollution controls. Let me assure you that such is not the case.

Our concern is that controls be rationally related to the nature of the emission sources and the quality of air we breathe.

It is because of our explicit recognition that some processes and plants, in some locations, may require extremely strict controls to protect adequately their neighborhoods, and our awareness of the burden to society that this level of control will impose that we are motivated to lighten the severity of the burden in cases where no real justification exists.

AIR QUALITY CRITERIA

This concept of tailoring emission restrictions to local air quality requirements is sometimes described as "allowing the air to become as dirty as we can stand it."

This characterization of a fundamentally rational approach to setting emission standards reveals a failure to grasp the basic concepts of our position.

Air quality is not described by numbers quantitating the concentration of contaminants in the air, but by the characteristics of the atmosphere.

Many of our citizenry may not be qualified to write standards for suspended particulates that, if attained, will assure a specified clarity in the atmosphere.

They are able, and have every right, to specify the frequency with which they would like to see the mountain tops on the horizon.

Typically, a contaminant, such as carbon monoxide, for example, is associated with a threshold level below which, for all practical purposes, its effect on the environment is zero.

Certainly in such cases there can be no rational basis for emission controls beyond those required to reach that threshold level in the environment.

But whether the air quality goal is "no effect", or "no significant effects", both industry and society must properly be concerned with the waste of resources involved in controls beyond this point while so many more pressing environmental needs are crying for our attention.

The task of relating the effects of atmospheric pollution—those phenomena observed and experienced by our people—to the levels of contamination which cause them is encompassed in the Criteria Documents responsibility given by the Clean Air Act to the Secretary.

Section 6 of S. 3466 would repeal the provisions of section 107(b) relating to the preparation of these criteria.

Unless alternative means for the performance of this important task are to be provided—such as the formation of a National Council on

Hazardous Physical and Chemical Agents as proposed by Dr. James H. Sterner to this committee July 31, 1968—we oppose such repeal.

AMBIENT AIR QUALITY STANDARDS

Both Section 7 of that bill and, Sections 2 and 3 of S. 3546, would amend the present provisions for the development of ambient air quality standards, and provide that all areas of the United States come under such standards.

We judge that, under the routes provided by either bill, the final outcome would be essentially the same.

Even with the full use of the best scientific data that can be assembled, selection of ambient air quality standards that are rationally related to the effects that the electorate wishes to prevent is a sophisticated process calling for the application of our highest skills and judgment in science, engineering, medicine, and law.

This is particularly so if, as is most proper, full consideration is to be given to those local factors enumerated by this committee in its report on S. 780 (90th Congress) as being appropriate to the setting of regional standards.

But whether ambient air quality standards are set by Federal regulation or by State or regional boards, the prior publication of the applicable criteria documents, and public hearings by which the evidence for the scientific and social considerations upon which they are based can be placed in the public record, in our opinion, are essential elements to the process.

AIR QUALITY CONTROL REGIONS

A second major change in the administrative pattern of the Federal air pollution control program is contemplated in section 6 of S. 3466, which proposes to repeal the provisions for air quality control regions. We hold this to be a backward step.

The adoption of uniform national ambient air quality standards would increase, rather than diminish, the importance of tailoring local abatement strategies to local conditions.

In any rational and efficient abatement program, the jurisdiction and authority of the control agency should be commensurate with the geographic extent and nature of the problem.

We cannot expect effective control in a metropolitan complex containing dozens of governmental units through the independent actions of each unit.

Neither can we assume that a State agency, with responsibilities for many cities of widely varying topography, meteorology, and patterns of industrial development, will adapt abatement strategies to each such city with the discrimination and sensitivity to local problems that can be exercised by a board concerned solely with that region.

Even should the ambient air quality standards setting now assigned to Air Quality Control Regions be eliminated from their functions, their usefulness and need remain.

If the current machinery for the establishment of these regions and their control agencies is too cumbersome, perhaps it may be streamlined, but we do not believe that it would be helpful to abandon the progress that has already been made in creating a body of regional authorities to cope with regional problems.

FEDERAL REGULATION OF FIXED SOURCES

Consistent with our position that regulatory authority should be exercised by an echelon of government with jurisdiction commensurate with the geographic dimensions of the problem, we would accept that where the emissions of a given plant, by reason of their residence time in the atmosphere and the quantities in which they may be emitted, would have a significant effect upon the ambient air quality in areas beyond the jurisdiction of the State or interstate agencies under which they would otherwise operate, their regulation may properly be a Federal function.

Conversely, such plants, constructed and operated within the guidelines provided by Federal regulations, should have protection against arbitrary or punitive standards that may otherwise be invoked locally when the inevitable commercial and residential growth builds up around them. Exercise of such Federal authority should pre-empt controls of the plants so regulated.

Within the limitations just described, we would not oppose provision for Federal regulation of such classes of fixed sources, as contemplated in the new Section 112 to the Clean Air Act proposed in Section 8 of S. 3466.

We hold that the restrictions placed upon such plants should be those appropriate to protect the ambient air quality in the surrounding regions.

Uniform national emission standards are not justified in either economics or engineering, and our recognition of the justification for Federal control under the circumstances just referred to is not meant to lessen our support for the policy expressed in Section 101(a)(3) of the Clean Air Act "that the prevention and control of air pollution at its source is the primary responsibility of States and local governments."

Proposed Section 112 would also direct the Secretary to control "emissions extremely hazardous to health." Most sources that might be so categorized are now under the Federal control through the Atomic Energy Commission.

Any others that may "present an imminent and substantial endangerment to the health of persons" are subject to abatement under the provisions of Section 108(k) of the Clean Air Act.

Without having a clearer view of the target toward which this proposed new authority is directed, it is difficult to comment further.

We certainly share the desire to protect the public from "emissions extremely hazardous to health," but unless it can be shown that neither present Federal authority nor State controls now provide adequate protection, we would oppose what seems to us an unnecessary extension of regulatory authority.

FEDERAL PERMIT SYSTEM

Subsection 4(c) of S. 3546 proposes to amend Section 108 of the Clean Air Act, to provide that no person shall construct or install any building, structure or facility subject to any air quality standard established or revised pursuant to Section 108 unless he installs, maintains and uses the latest available pollution control techniques and first secures a certificate of compliance from the Secretary, or as appropriate, the State pollution control agency.

We understand that this legislation has been offered in an effort to ensure that, a few years from now, we will have a minimum of "catching up" to do on facilities that are constructed during the interim.

Whereas we share your desire to achieve this goal, we have grave doubts concerning both some of the language in which the provisions are phrased and some of the regulatory concepts incorporated in them.

The other portions of Section 108 now provide for both ambient air quality and emission standards and make a breach of either a violation under the Act.

Thus, this subsection, as now written, if strictly applied, would impose a Federal permit system upon every backyard barbecue, every home-heating plant, every gas range, every home hobby shop, as well as upon all commercial and industrial establishments, for these, and many other personal activities generate air contaminants that are now, or soon will be, the subject of ambient air quality standards under Section 108 of the Clean Air Act.

Although the proposed provisions would authorize the "certificate of compliance" to be issued by the State pollution control agency "as appropriate", no standards for judging the appropriateness of this delegation of responsibility are offered.

Furthermore, no role is given local, regional or interstate agencies in this function.

A further semantic problem lies in the provision that a "certificate of compliance" must precede the construction or installation of the regulated facility.

It is a manifest impossibility for any authority to certify that any facility is "maintaining and using" approved control equipment before construction has been started.

We believe that individual certificate requirements, if any, should be restricted to significant sources and based only upon their compliance with specified standards of emission control.

Another unfortunate word choice occurs in line 19 of page 17 of the bill. The "latest available pollution control techniques" are not necessarily the best, or most appropriate, for any given installation.

The qualifying phrase "such techniques shall be consistent with the information developed pursuant to Section 107(c)" only partially compensates for this specification.

But our concern with this proposal involves much more fundamental and far more subtle considerations. Choice of "the best available technology" for any given installation must involve, at least implicitly, consideration of hazards to the environment inherent in the emission to be controlled.

What is "feasible" depends both upon the need for control and the social and commercial values of the product or services involved.

We would hope that the Congress would provide for clear recognition of these factors in the language of any legislation encompassing this concept.

Another defect of a concept requiring the application of maximum available technology is that it focuses its attention on only one narrow aspect of the problem and, in effect, limits the control agency or responsible industry from seeking a solution that will permit an essential or desirable function to be performed with the minimum stress upon the total environment.

Perhaps an example or two may illustrate the kind of thing we are talking about.

Consider a plant that generates a large volume of waste gases containing "inert," but nonetheless, undesirable, fine particulates.

These may be removed by a high energy water scrubber; the efficiency of removal will depend upon the pressure drop, and hence, energy requirement, of that scrubber.

The quantities of power required to operate such a scrubber may be very substantial.

If the scrubber is operated at a 40-inch pressure drop, perhaps 97 percent of the particulates can be removed, but still leaving enough in the exit stream to produce a visible plume and to conflict with process weight regulations that have to be adopted in some American jurisdictions.

By doubling the pressure drop to 70 or 80 inches, we may perhaps reduce plume visibility to near the vanishing point, and meet the more restrictive of the weight-rate emission regulations, and some might term this added collection as better technology.

Even if the plant can afford this, are we really reducing our pollution there?

The increase in electrical energy demand for a single production unit required to achieve this improved scrubber efficiency may well reach several megawatts.

We should seriously consider whether we are reducing our stress upon the environment by substituting the particulates, oxides of sulfur and nitrogen, and thermal pollution resulting from the generation of this additional quantity of electrical power for the few extra pounds of inert particulates that we take out of the plant discharges.

Or take the case of a plant discharge containing minor quantities of solvent vapor. This can be controlled by installation of a fume incinerator, and most would call this an application of advanced control technology.

In matter of fact, however, no judgment can be made on whether or not installation of the fume incinerator is really protective to our environment without consideration of whether the oxides of nitrogen formed in the fume incinerator are more of a threat to our air quality than the solvent vapors destroyed therein, or whether the consumption of a "clean" fuel, such as natural gas, in the incinerator will cause a need to burn a less-clean fuel at some other time and place to meet our energy demands, and what the effect of the emissions from such fuel consumption might be.

In short, an inflexible policy of requiring the "best available technology" for air pollution control is self-defeating because it fails to take account of ambient air quality or the effects of the discharges upon it.

The "best available" control technology may in some cases be quite inadequate to make a given plant or process an acceptable member of some neighborhoods, in other cases it is merely wasteful, and in still others would transfer to other facets of our environment stresses much greater than those they seek to relieve at the point of application.

FUELS AND FUEL ADDITIVES

Two bills before this committee deal with the subject of motor fuels and additives.

In general, we feel that such legislation to provide for regulation of fuel composition and additive use is premature.

Almost 21½ years ago, in the Air Quality Act of 1967, Congress authorized the Secretary to require the registration of fuels and additives (Section 210(b)) and to set standards for the limitation of contaminants in vehicle emissions that he found a hazard to the health and welfare of any persons (Section 202(a)).

The fact that, to date, he has exercised neither authority with respect to any fuel additive (or exhaust product thereof) would seem to indicate that either the knowledge necessary for the effective utilization of this authority or the need therefor is lacking.

The Secretary has represented that he has not proceeded under Section 210(b) because the informational items authorized in that section are inadequate for his purposes.

The fuels and additive industries, however, have freely offered to supply, on a voluntary basis, such available information as he may request. We know of no instance in which any such request has been refused.

We reiterate our views that the informational requirements for registration of fuel additives ought not to be subject to abuse as an indirect licensure mechanism, and urge that Section 210(b) in the Act be retained without amendment.

If Congress is unwilling to leave the filing of additional informations on a purely voluntary basis, we would suggest that any additional requirements be clearly delineated in a separate subsection of the Act, and be enforced by the application of civil penalties.

Licensure of motor fuel is contemplated in Amendment 501 to S. 3229, and in S. 3466.

We commend the Congress for facing this issue squarely, and providing this opportunity for the merits and weaknesses of such a program to be explored.

We trust that the Congressional policy forged in this debate will be clearly and precisely defined in the legislative record now being created, and solicit your most careful consideration of the complex scientific and economic facets of this question before making your judgment.

The focus of attention in this matter is on the lead alkyls used as antiknock agents in almost all of the motor fuels now being sold.

Although concern has been expressed by some regarding the toxicity of the lead compounds discharged in the exhaust gases, the basic justification offered by those proposing the elimination of lead alkyls from motor fuel seems to be that more effective and longer-lasting emission control devices could then be developed for general use.

We are sure that the testimony already presented here has convinced this committee that expert opinion on this point is divided, and we leave to other witnesses the presentation of the evidence pro and con.

Although the long-term significance of the problem is inescapable, the urgency for an immediate decision on lead is debatable.

The massive economic and technological implications inherent in any regulatory intervention are obvious.

Under these circumstances, discretion would dictate treading cautiously in this area in which improper judgments would have such far-reaching and difficult reversible effects.

Should the Congress reject the views we have just expressed and deem it necessary for the Secretary to have, in ready reserve, authority for the regulation of fuel composition and additive use, we would urge that such authority be circumscribed with safeguards to minimize the likelihood of promulgation of regulations inappropriate for the purposes they are designed to achieve.

To that end, we suggest language requiring the Secretary to hold public hearings before adopting any such regulations, and to make findings, based on evidence presented at such hearings, to the effect that (1) the emissions proposed to be controlled constitute a significant risk to the public health and welfare; (2) there are no feasible alternatives for the control of these emissions other than through the control of fuel composition or additive use; and (3) the proposed regulations may reasonably be anticipated to be effective in abating the risks to the public health and welfare cited in the first finding.

We would further urge that, in any challenge of regulations issued subsequent to such findings, the findings be subject to judicial review, and the court be required to find that the weight of the evidence submitted in hearings supports the findings of the Secretary before it may sustain the challenged regulations.

Again, should authority be granted and regulations issued, we would hope that the problem of motor vehicle emission control would be recognized as requiring the cooperation, as equals, of the engine, control device, fuel, and additive manufacturers.

The language of Section 5(b) of S. 3466 requiring subservience of the fuel and additive industry to the demands of the makers of control devices seems particularly inappropriate.

Furthermore, the requirement there proposed for universal compatibility among all fuels and additives and all control devices may unduly restrict innovative research and development.

Although we would not suggest that the petroleum industry be required to proliferate the number of fuel grades it distributes, neither should it arbitrarily be prohibited from offering alternative types of fuel for use in vehicles with dissimilar kinds of control devices.

SOLVENT CONTROLS

We do not feel that the language of the new Section 212 proposed to be added to the Clean Air Act by Title II of S. 3229 is consistent with the goals ascribed to it in the "Summary of Provisions" released by Senator Muskie at the time the bill was introduced.

The provisions are there described in terms relating the need for controls largely to the photochemical smog problem, and identifying certain "organic solvents, paints and other oxidants" as the material subject to the proposed regulatory authority.

The language of the bill itself, however, lists "solvents, coating materials, organic or inorganic materials, and products containing any such substance as a constituent thereof, either singly or by classes or in combinations" as subject to regulation at the discretion of the Secretary.

There is no substance in the universe that would not fall within this categorization.

We are at a loss to imagine what "additional substances or products" are envisaged by subsection (f) of the proposed section as also subject to this regulation.

Our opposition to the provisions for Federal solvent controls stems from two considerations: (1) Our knowledge concerning the effect of solvent substitution upon the overall photochemical reaction process in the real atmosphere is inadequate to enable us to specify substitutions with any great confidence that we are thereby ameliorating the smog problem; and (2) the pattern of commercial distribution and sale of solvent-containing, consumer end-use items is such that major product lines involving substantial solvent volumes are largely compounded and distributed, and subject to control, on a regional basis, and uniform national standards would present no advantage to the industry to compensate for the administrative burdens and added solvent costs that such regulation would involve.

With respect to the first point, let us point out that most of these solvents are what we would term "slowly photoreactive".

Whereas, when irradiated with oxides of nitrogen for an adequate length of time, they may yield oxidants and/or eye irritants, the time required for this to proceed to a significant degree may be greater than the period of strong sunlight in the day.

Only when they are present in a system at substantially higher concentrations than that of the oxides of nitrogen is their measured photoreactivity of even this marginal significance. In the real atmosphere, these ratios are reversed.

It is almost impossible to detect, even in the laboratory, any augmentation of smog manifestations from the addition of realistic concentrations of such solvent vapors to irradiated simulated automobile exhaust systems.

The comments we have made on solvent photoreactivity derive from the findings of a two-year study conducted by Stanford Research Institute on behalf of a group of solvent-manufacturing MCA member companies.

Findings are summarized in a summary report; copies have been provided to the staff, and we ask that it be made a part of the record of this hearing.

Senator Boggs. That will be made a part of the hearing record.
(The document referred to follows:)

SUMMARY REPORT

PHOTOREACTIVITY OF
TRICHLOROETHYLENE

Prepared for

MANUFACTURING CHEMISTS ASSOCIATION

By

KATHERINE W. WILSON

Stanford Research Institute



STANFORD RESEARCH INSTITUTE
SOUTH PASADENA, CALIFORNIA



September 1969

Summary Report

PHOTOREACTIVITY OF TRICHLOROETHYLENE

Prepared for:

Manufacturing Chemists Association

By: Katherine W. Wilson, Stanford Research Institute

SRI Project PSC-6687

Approved:

R. D. Englert, Executive Director
Southern California Laboratories

I INTRODUCTION

This report summarizes the results of a two-year project to develop new and improved data on the photochemical reactivity of trichloroethylene and its possible involvement in the photochemical smog phenomena that first attracted public notice in the Los Angeles basin. The work was performed under a contract with the Manufacturing Chemists Association with the financial support of a group of manufacturers of that solvent.

The major tasks of the project were: (1) the development and construction of a new smog chamber designed to facilitate the study of both rapidly and slowly reacting vapors; (2) the validation and calibration of the chamber with runs of compounds whose reactivities have been extensively studied; (3) the study of simple systems of trichloroethylene and nitric oxide, in static chamber experiments and over a wide range of solvent vapor concentrations and solvent to nitric oxide concentrations ratios; and (4) the study of trichloroethylene in more complex systems that more closely simulate possible situations in urban atmospheres subject to photochemical smog. This last group of experiments included operation of the chamber in both static and dynamic test modes.

Many of the results of the first three tasks were summarized in an Interim Report issued in December 1968. The present report recaps that summary and presents the highlights of the data accumulated since that time. Conclusions drawn from all these findings are outlined, with due consideration of the results of earlier investigators.

The papers listed at the end of this Summary Report identify the sources in which more detailed expositions of this project and of related studies may be found.

II CONCLUSIONS

The Institute team has carefully considered the results of these chamber experiments and the spatial and temporal distributions of trichloroethylene vapor concentrations that may reasonably be expected to occur in urban atmospheres. These results demonstrate that, although the tolerance of the atmosphere is not limitless, the ambient concentrations of trichloroethylene characteristic of present or foreseeable patterns of industrial use of that solvent would not lead to measurable photochemical smog manifestations. Neither would they augment such manifestations resulting from the presence of more reactive species in the atmosphere. The experimental findings that support these conclusions are:

1. In simple solvent vapor - nitric oxide systems, with the chamber operated in a static mode, both the rates of formation of smog components and the absolute values of their maximum observed concentrations fell rapidly as the trichloroethylene : nitric oxide ratio decreased and, at any fixed trichloroethylene : nitric oxide ratio, fell slowly as the concentration of trichloroethylene decreased. The levels of these values at which trichloroethylene photoreactivity became negligible were far higher than those we could expect to find in the community atmosphere.
2. In static experiments in which trichloroethylene vapors (at 2 ppm) were irradiated in the presence of a propylene - nitric oxide mixture (simulating a smog-forming atmosphere), there was a slight acceleration of both the formation and decay of oxidant, with a small elevation in its peak value.

There was no significant change in the level of eye irritants. Mixed n-paraffins reacted in a manner almost identical to that of trichloroethylene. Mixed xylenes responded similarly, with a greater effect upon rates of appearance of reaction products than upon the ultimate levels attained. At lower solvent vapor concentrations, even these evidences of marginal contribution to smog generation would be expected to disappear.

3. Experiments were designed to simulate the short duration conditions that may occur when an industrial stack discharges trichloroethylene vapors into a constantly replenished, photochemically reactive, polluted atmosphere. The dynamics of the plume were simulated by injecting a quantity of trichloroethylene vapor into the photolyzing mass. We then followed both the decay of the resulting trichloroethylene concentration, as it underwent dilution and reaction, and the level of oxidant developing in the mixture. Even at initial trichloroethylene concentrations of 100 ppm, no increase in oxidant level could be measured.

These experimental results are discussed in the following paragraphs and more extensively in the referenced technical reports. They illustrate the complexity of the problem of relating chamber experiments to ambient atmospheric chemistry and suggest the appropriateness of incorporating among the procedures by which the photochemical reactivities of solvents are evaluated the kinds of measurements reported herein.

III RESULTS AND DISCUSSION

Tests of performance of the smog chamber demonstrated that it provided intensities and spectral distributions of irradiation approximately equal to noonday sunlight in the spectral region from 300 to 400 nm, a pure air feed low in oxides of nitrogen (less than 0.15 ppm) and organics (only a trace), nonreactive chamber walls (all fluorocarbon coated), and low leakage rates ($1\frac{1}{2}\%$ per hour). Eye irritation calibration runs with chloropicrin and pure air confirmed the efficacy of the design of the eyeports and the associated sample circulation system.

Static runs with compounds that have been studied extensively by other investigators (including trans-2-butene, ethylene, cyclohexane, and methyl ethyl ketone) gave results consistent with those previously reported and demonstrated the capability of the system to yield meaningful results for compounds of low photoreactivities. Instrumental (long-path infrared) and wet chemical methods of monitoring concentrations of reactants and products were shown to be of adequate sensitivity, stability of calibration, and precision for experiments at the parts-per-million level or higher.

In the experiments of Task 3 (see Introduction), selected concentrations of trichloroethylene (or reference compound) and nitric oxide were introduced into the chamber filled with purified air. The well-stirred mixture was then irradiated for approximately eight hours, and the rates of disappearance of the initial reactants and the rates of appearance and decay of certain intermediate reactants and (or) final products were monitored. Eye irritation was measured by a human test panel at selected times. The data from typical runs with a reference material (ethylene) and trichloroethylene are presented in Figures 1 and 2.

CONCENTRATION CHANGES DURING PHOTOOXIDATION
OF ETHYLENE (8 ppm) WITH NITROGEN OXIDES (1 ppm)

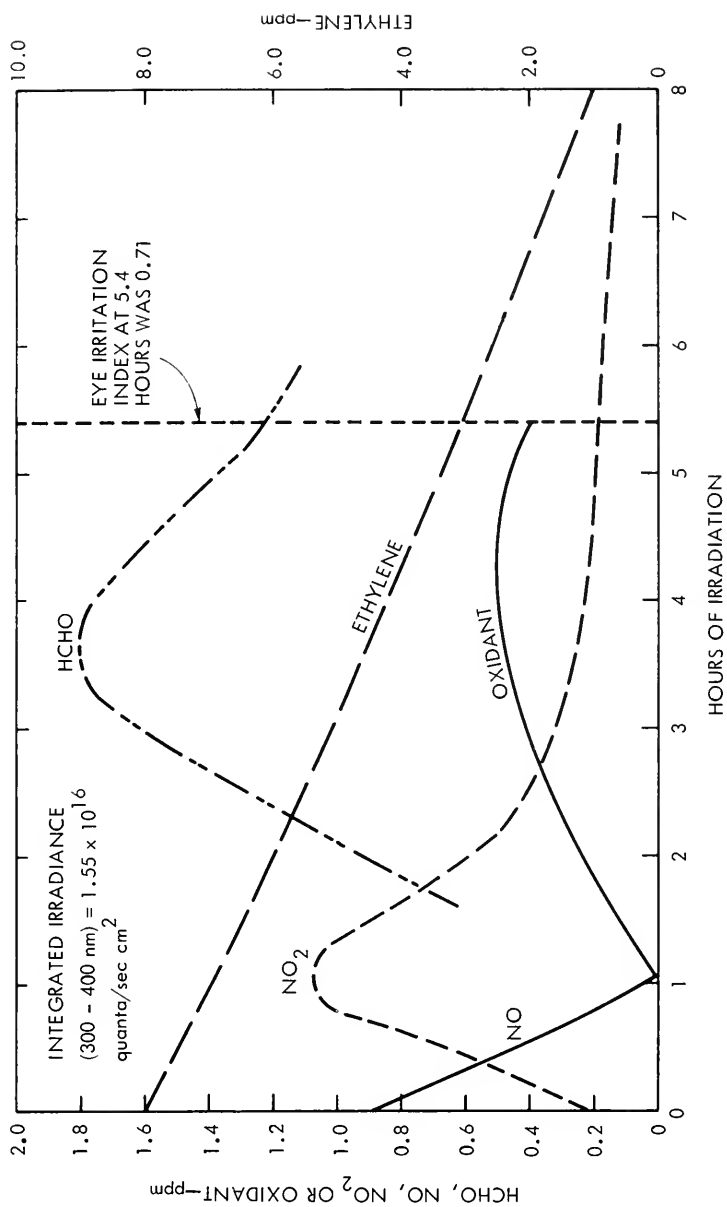


Figure 1

CONCENTRATION CHANGES DURING PHOTOOXIDATION OF
TRICHLOROETHYLENE (8 ppm) WITH NITROGEN OXIDES (1 ppm)

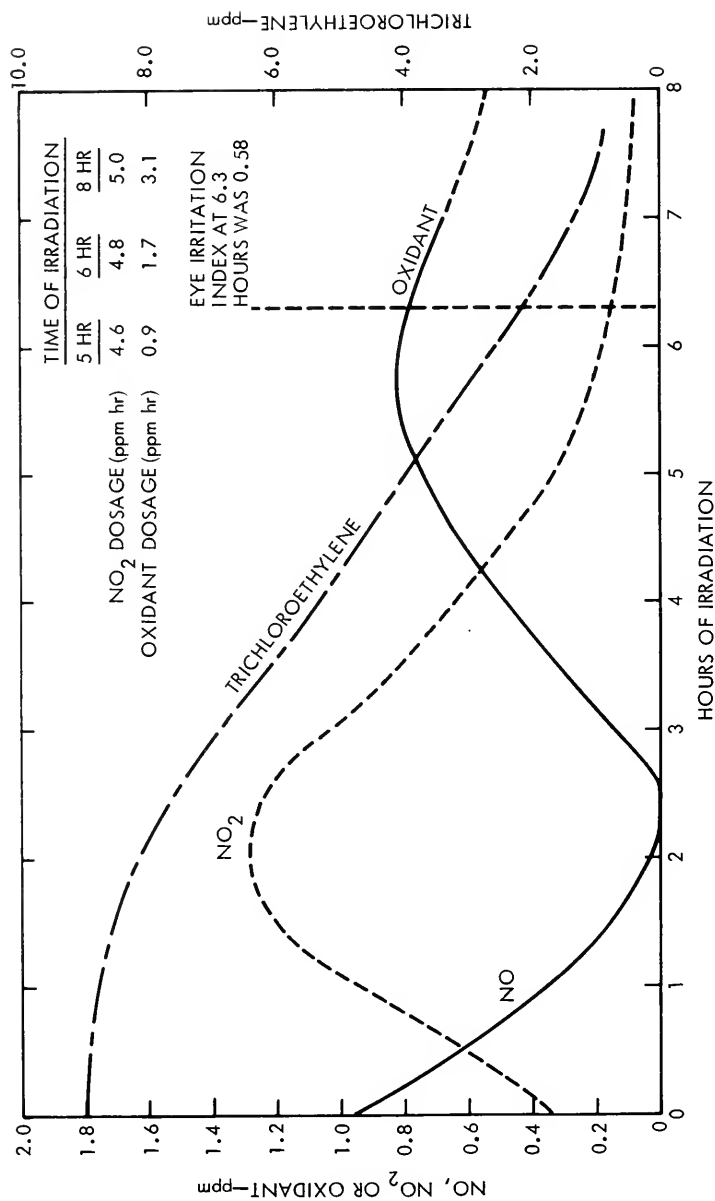


Figure 2

The eye irritation index used in this report to quantify the intensity of eye irritation observed by the test panel is calculated as the common logarithm of the ratio of 240 seconds (cutoff of panelists' test exposures) to the statistical estimate of the geometric mean of the individual panelists' response times--that is, Eye Irritation Index = $\log 240/T_{50}$.

On this scale, values of 0.15 represent no significant eye irritation; 0.15 to 0.40, light irritation; 0.40 to 0.65, moderate irritation; and 0.65 to 0.90, severe irritation. The reported values have a probable uncertainty of 0.10 units.

Other values derived from the data shown in the graphs and used as bases for comparisons between different test conditions or different organic reactants are the nitrogen dioxide dosage (the integral of the area below the nitrogen dioxide concentration versus time plot) and the corresponding oxidant dosage. Regardless of which of these indices are selected for ranking the photochemical reactivities of various trichloroethylene - nitric oxide mixtures, we find that the reactivity rating depends on the initial ratio of trichloroethylene to nitric oxide concentrations. As this ratio decreased, all measures of photoreactivity decreased, and when it fell substantially below unity (that is, when the initial concentration of nitric oxide was several times that of the trichloroethylene) the photoreactivity of the latter was completely inhibited.

At any selected ratio of initial reactant concentrations, the maximum oxidant concentration observed decreased as the initial trichloroethylene concentration decreased, as shown in Figure 3. For all initial ratios exceeding unity, the curves of maximum oxidant plotted against initial trichloroethylene concentration seemed to converge below 0.1 ppm oxidant at about 0.5 ppm solvent vapor.

MAXIMUM OXIDANT CONCENTRATIONS IN 8 HOURS FOR
VARIOUS TRICHLOROETHYLENE:NITROGEN OXIDES RATIOS

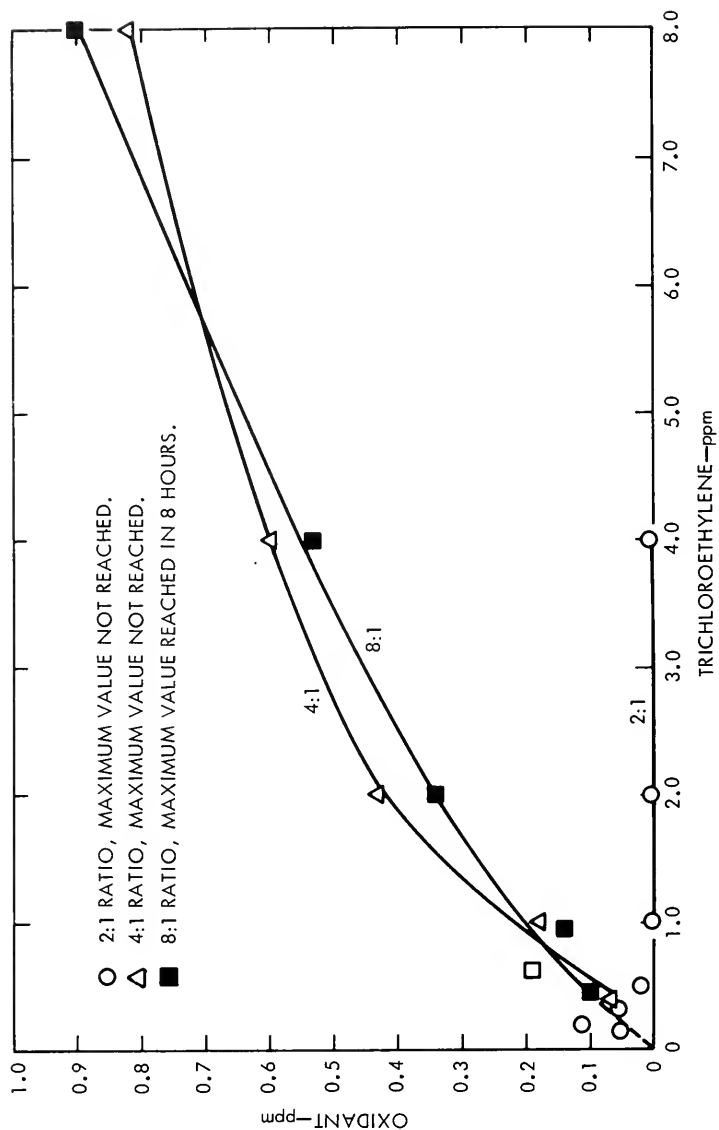


Figure 3

The eye irritation observed in runs at high trichloroethylene:nitric oxide ratios and at high initial solvent vapor concentrations (4 or 8 ppm) decreased with reductions in the trichloroethylene concentration. In the runs made with 2 ppm trichloroethylene or less, the eye irritation measured was indistinguishable from that of the background.

When an effort was made to relate the results of Task 3 to the significance of trichloroethylene as a smog contributor in the real atmosphere, it was immediately apparent that neither the initial concentrations of the solvent vapors nor the solvent:nitric oxide ratios required for measurable reactivity in the simple chamber experiments were likely to be found in the community atmosphere. Based on the LACAPCD estimates of trichloroethylene use in the Los Angeles basin before the imposition of controls on that solvent (66 tons per day), the usually assumed atmospheric mixing volume of the region (125 cubic miles, derived from an assumption of a 600-foot mixing depth over an 1100-square-mile area), and an average residence time of 24 hours, we calculate an anticipated average concentration under these rather severe conditions of about 0.02 ppm. The nitrogen oxide concentrations in Los Angeles County are reported to range, in the early daylight hours under low ventilation conditions, from 0.2 to 1.0 ppm. Thus, both the absolute concentration of trichloroethylene vapors and the trichloroethylene:nitric oxide ratios calculated therefrom are one or two orders of magnitude below those at which photoreactivity could be demonstrated in the chamber or could be predicted, by extrapolation from chamber data taken at the higher level experiments, to be of even marginal significance.

We recognize that trichloroethylene vapors do not exist alone in the urban atmosphere, and that "calculated average values" may be very poor estimates of concentrations that may exist for brief periods or over

limited areas. The experiments of Task 4 (see Introduction) were performed to provide a basis for evaluating the reactivity of trichloroethylene under conditions providing a more realistic simulation of urban atmosphere, including these transient conditions, than did the runs of Task 3.

Static runs were performed in which trichloroethylene vapor was added to a "contaminated" air designed to simulate the smog-forming combination of automobile exhausts and power station plumes. A mixture of 3 ppm propylene and 2 ppm nitric oxide was selected as representative (in rates of photo-reactivity and severity of smog manifestations produced therefrom) of such an urban atmosphere. Measurements were made to detect any augmentation of smog manifestations produced by the addition of trichloroethylene or reference solvent to this mixture.

Even though five to six hours of the noonday intensity of irradiation provided by the chamber's lamp bank was considered equivalent to a full-day's cycle of sunlight, the test runs were extended for periods of up to eight hours to provide maximum opportunity for the photolysis of slowly reacting solvent vapors to proceed. The added solvent vapors were tested at concentrations (2 ppm) well above any that might be postulated to persist for any substantial interval in the out-of-doors atmosphere.

The results of these experiments are presented graphically in Figures 4 to 7. Trichloroethylene and the comparison solvents (xylene and n-paraffins*) all decreased the time required for the attainment of maximum nitrogen dioxide levels and the induction time for oxidant formation, significantly in the case of xylenes and only marginally for trichloroethylene and the n-paraffins. Oxidant levels, as compared to those reached in the

* n-Nonane, n-decane, and n-undecane mixed 1:1:1 by volume.

CONCENTRATION CHANGES DURING PHOTOOXIDATION OF
PROPYLENE (3 ppm) WITH NITROGEN OXIDES (2 ppm)

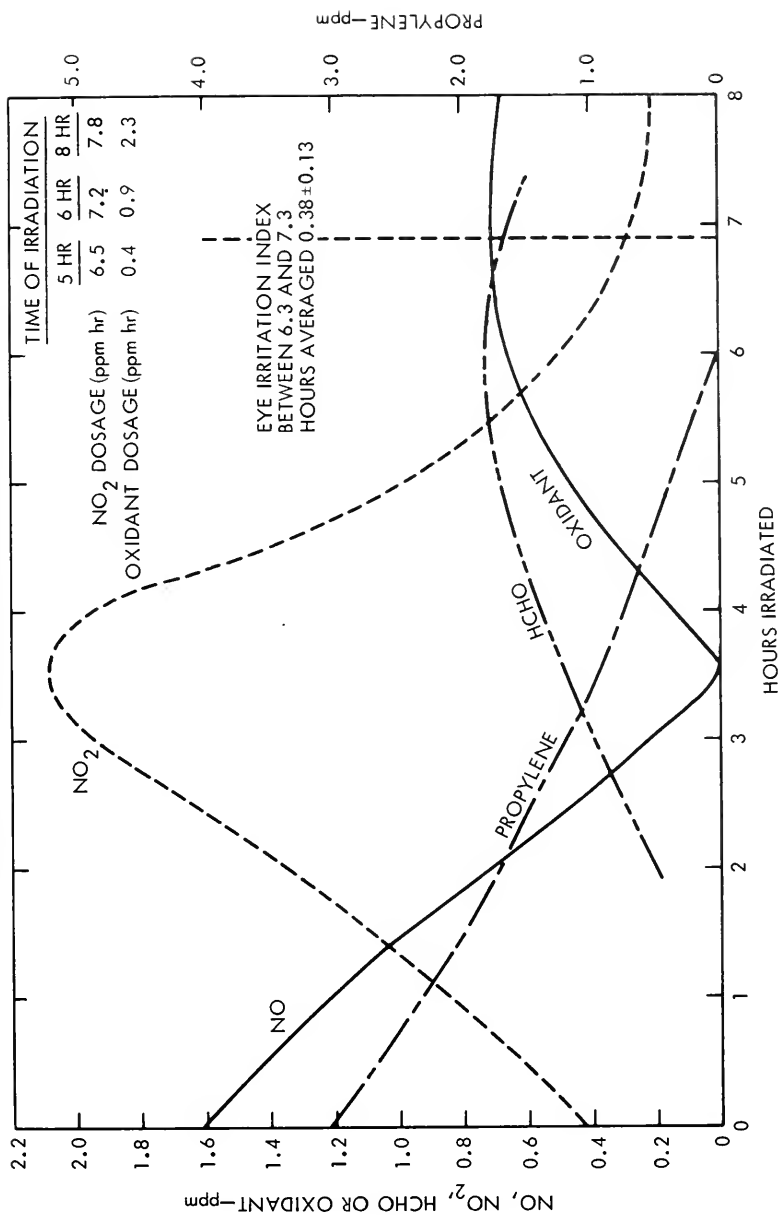


Figure 4

CONCENTRATION CHANGES DURING PHOTOOXIDATION OF TRICHLOROETHYLENE
(2 ppm) WITH PROPYLENE (3 ppm) AND NITROGEN OXIDES (2 ppm)

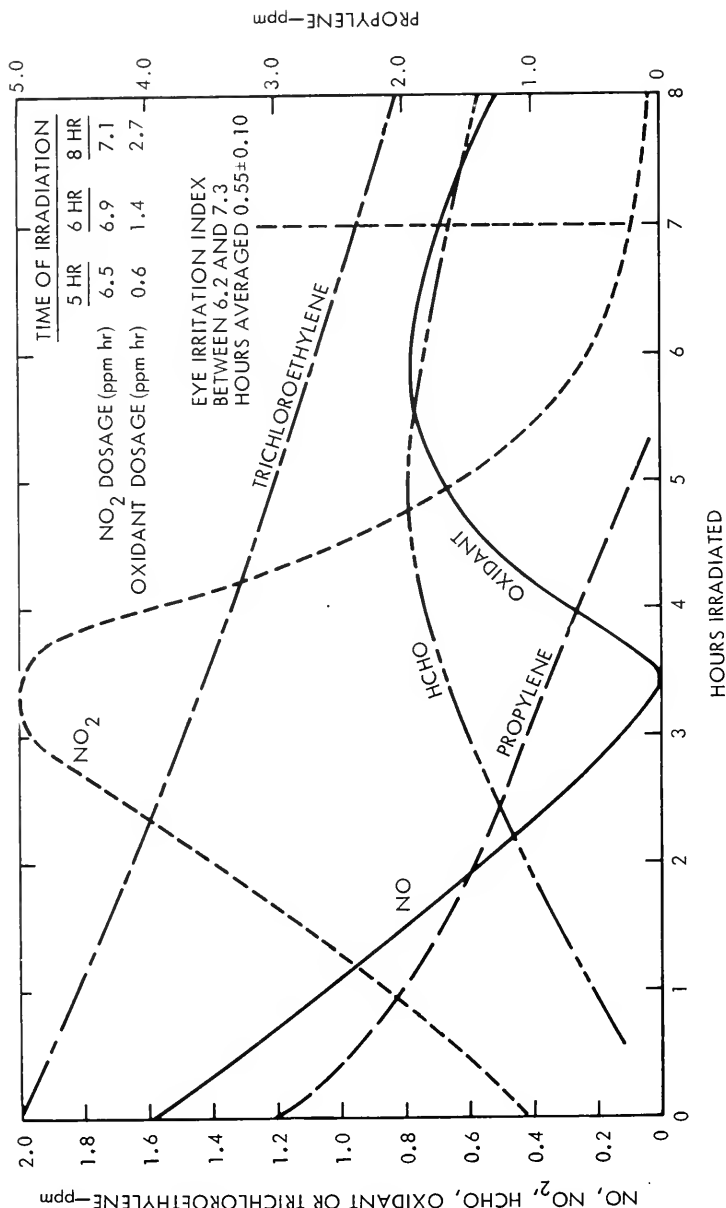


Figure 5

CONCENTRATION CHANGES DURING PHOTOOXIDATION OF MIXED XYLENES
(2 ppm) WITH PROPYLENE (3 ppm) AND NITROGEN OXIDES (2 ppm)

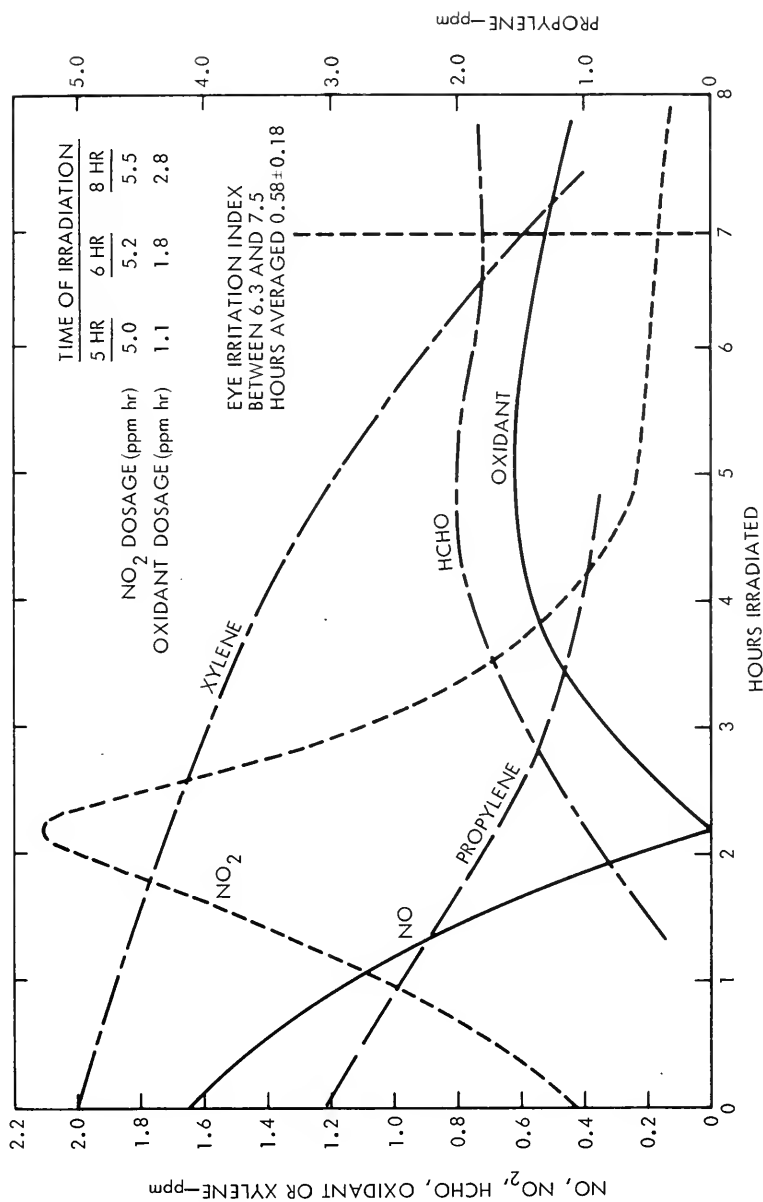


Figure 6

CONCENTRATION CHANGES DURING PHOTOXIDATION OF N-PARAFFINS
(2 ppm) WITH PROPYLENE (3 ppm) AND NITROGEN OXIDES (2 ppm)

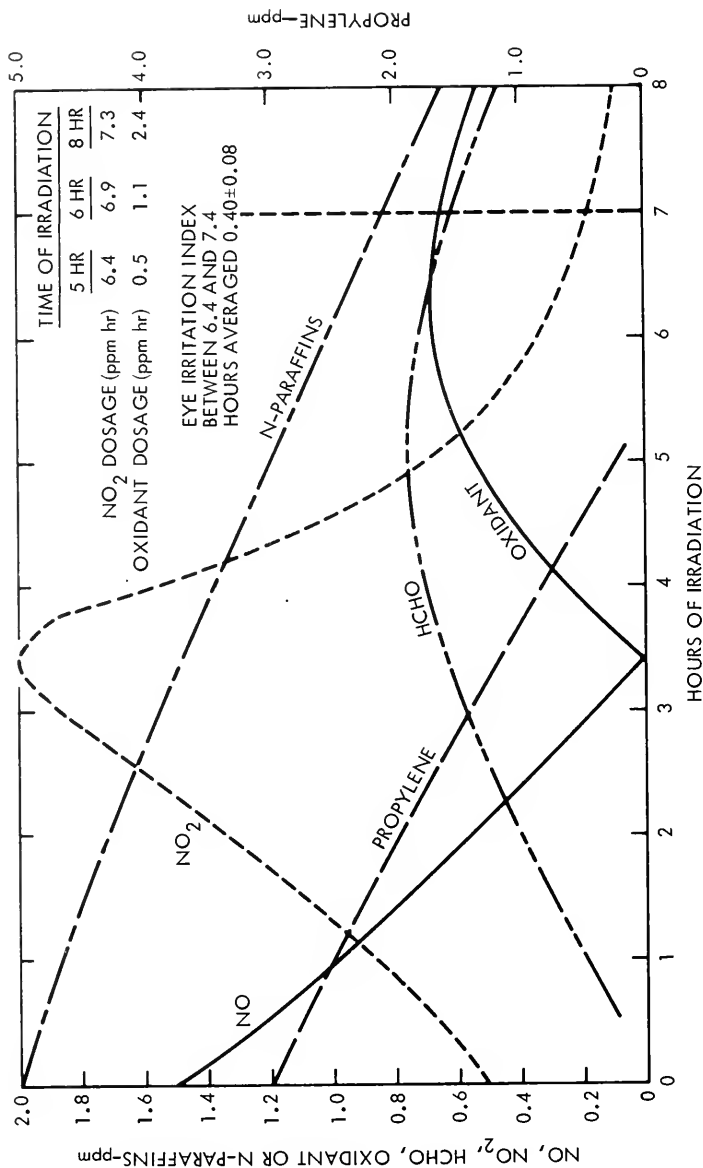


Figure 7

propylene - nitric oxide system alone, were very slightly (less than 0.2 ppm) increased at five hours, and decreased at eight hours. Nitrogen dioxide and oxidant dosage increases are shown on the referenced graphs, as are the measured eye irritation indices.

The minimal extent to which the n-paraffins and trichloroethylene augment rates of nitrogen dioxide and oxidant formation, even at these high concentrations, is noteworthy. The shift in eye irritation indices is not statistically significant. At lower solvent vapor concentrations, these increases in system reactivity would be expected to be even less.

There is one real-life situation in which solvent vapor may exist at a high absolute concentration and at a high ratio to the accompanying nitrogen oxides concentration. This is in the exhaust plume from an industrial stack or vent. As a volume of that plume drifts downwind, it is progressively diluted by ambient air (possibly highly photoreactive air). For at least a portion of the plume's existence, it may exhibit concentrations (and concentration ratios) of reactants that have been shown in our static chamber experiments to lead to measureable rates of photoreactivity for trichloroethylene. A series of experiments were performed to test the hypothesis that, under these conditions, trichloroethylene might contribute significantly to the formation of photochemical smog.

The reactive atmosphere into which the plume was postulated to disperse was assumed to be a dynamic system in a steady state, with the constant input of reactive hydrocarbons and oxides of nitrogen from automobile exhausts and power plant stacks balanced by the loss of these materials by photolysis or other depletion mechanisms. This situation was simulated by operating the chamber in the dynamic mode, with a feed of purified air containing 5 ppm trans-2-butene and 1.2 ppm nitric oxide. The feed rate was adjusted to give

an average chamber residence time of 120 minutes. Mixing time was short in comparison with residence time, so the chamber contents, after a suitable start-up period, exhibited no significant spatial or temporal variations and simulated a well-developed smoggy atmosphere.

Into this photolyzing mixture, a single pulse of solvent vapor was injected in an amount calculated to produce the desired initial concentration. As this initial concentration was reduced by dilution and washout with the continuous chamber feed, its time history simulated that of the volume element in a dispersing plume, referred to in the preceeding paragraph. The introduction of this trichloroethylene vapor produced no detectable perturbation of the smog manifestations in the chamber. These negative findings gain greater significance when we consider that the experiment design led to far slower dilution of the solvent vapors in the chamber than would be calculated for a stack plume under even very stagnant conditions, and hence a much greater opportunity for reaction than would be expected to be provided in the real plume.

In this series of experiments, trichloroethylene was tested at initial concentrations of 8 and 100 ppm. In spite of the absence of any demonstrable contributions to smog components, the rate of disappearance of the trichloroethylene from the chamber (145% per hour, with first-order kinetics) was substantially greater than that attributable to dilution and washout (47% per hour). This observation suggests the existence of atmospheric clearance mechanisms for trichloroethylene that do not produce measureable smog manifestations. A similar absence of demonstrable contributions to smog components was observed with n-paraffin solvents (at 8 ppm). Pulses of more reactive additives at this concentration, such as xylenes or trans-2-butene, did perturb the oxidant and formaldehyde concentrations in the chamber.

IV PHOTOREACTIVITY RATINGS

There are many phenomena observed in chamber experiments--time to formation of maximum nitrogen dioxide concentration, oxidant concentration or dosage, and intensity of eye irritation after a predetermined time--that can be quantified to provide indices of photoreactivity. In spite of the general similarity of patterns observed in our experiments with trichloroethylene and other slowly reacting materials, the relative ranking of these materials would be very sensitive to the index selected as the basis for such ranking.

Besides the problem of index selection, the usefulness of data from simple systems studied in a static mode experiment is limited by failure to simulate all the many significant factors present in a complex dynamic atmosphere. Among those not simulated in such static mode tests are: the continuous addition of reactants, interactions among these reactants, dilution and transport of pollutants at rates that depend on meteorological conditions, and diurnal cyclical and random variations in light intensity. The general lack of knowledge concerning the composition of all the contaminants introduced into the atmosphere, and of the nature and rates of the photochemical and nonphotochemical reactions involved, precludes bridging this gap at present by using the tools of mathematical modeling and computer simulation.

However, by selecting a chamber composition that more closely simulates a smog-forming ambient atmosphere, and by using both dynamic and static modes of chamber operation, data may be obtained that can be extrapolated to make the desired judgments with greater confidence. In such a system, we have found that the most sensitive indicators of the photoreactivity of a test

vapor are the acceleration of the initial appearance of oxidant in the statically operated chamber and the occurrence of the nitrogen dioxide concentration peak.

Trichloroethylene vapors, when irradiated in the presence of simulated automobile exhaust, influenced these indices of photoreactivity only when present at initial concentrations approximately equal to those of the reactive hydrocarbon (propylene, at 3 ppm). At somewhat lower levels, even these slight evidences of participation in smog formation would not be expected to be detectable.

Such low levels of photoreactivity preclude the detection of identifiable effects of trichloroethylene in the open atmosphere, even though concentrations comparable to those used in our chamber tests were achieved for test purposes. Estimating the tolerance of urban atmospheres for trichloroethylene vapors on the basis of the results of laboratory study (giving greater weight to the data from those tests that more closely simulate conditions in these atmospheres), we conclude that average ambient air concentrations of trichloroethylene would certainly have to greatly exceed 0.02 ppm before any effect on the actual atmosphere could be anticipated.

* * * * *

The data referred to in this summary, and the experimental techniques and equipment used in their generation, are presented in the first three technical papers listed below. These papers constitute our technical report to the Manufacturing Chemists' Association.

Doyle, G. J., Design and Performance of a Facility (Smog Chamber) for Studying Photochemical Reactions Under Conditions Simulating the Tropospheric Atmosphere, submitted for publication in Environ. Sci. Tech.

Wilson, K. W., Doyle, G. J., Hansen, D. A., and Englert, R. D., Photochemical Reactivities of Organic Solvents. I. Calibration Experiments in a New Smog Chamber, to be submitted for publication in Environ. Sci. Tech.

Wilson, K. W., Doyle, G. J., Hansen, D. A., and Englert, R. D., Photochemical Reactivities of Organic Solvents. II. Measurement of Reactivities of Trichloroethylene and Other Solvents, to be submitted for publication in Environ. Sci. Tech.

Altshuller, A. P. and Bufalini, J. J., Photochemical Aspects of Air Pollution: A Review, Photochem. Photobiol., 4, 47-146 (1965)

Brunelle, M. F., Dickinson, J. E., and Hamming, W. J., Effectiveness of Organic Solvents in Photochemical Smog Formation, Los Angeles Air Pollution Control District, July 1966

ACKNOWLEDGMENT

We wish to acknowledge the assistance of technical representatives of the sponsoring group of trichloroethylene producers and of Dr. W. L. Faith.

Figures

- Figure 1. Concentration changes during photooxidation of ethylene (8 ppm) with nitrogen oxides (1 ppm).
- Figure 2. Concentration changes during photooxidation of trichloroethylene (8 ppm) with nitrogen oxides (1 ppm).
- Figure 3. Maximum oxidant concentrations in 8 hours for various trichloroethylene:nitrogen oxides ratios.
- Figure 4. Concentration changes during photooxidation of propylene (3 ppm) with nitrogen oxides (2 ppm).
- Figure 5. Concentration changes during photooxidation of trichloroethylene (2 ppm) with propylene (3 ppm) and nitrogen oxides (2 ppm).
- Figure 6. Concentration changes during photooxidation of mixed xylenes (2 ppm) with propylene (3 ppm) and nitrogen oxides (2 ppm).
- Figure 7. Concentration changes during photooxidation of n-paraffins (2 ppm) with propylene (3 ppm) and nitrogen oxides (2 ppm).

Mr. BIXBY. We would leave to the architectural coatings industry any specific recommendations they would make with regard to the regulation of their products, but we wish to express our deepest concern that the far broader authorities provided by the present language of this proposal may unintentionally result in the arbitrary and unjustified control of a great variety of chemical products.

Inasmuch as the proposed section is entitled "Solvents", it may have been intended to refer only to the organic and inorganic constituents of what are nominally organic solvent systems.

If this should be the case, it should clearly be so stated.

However, we cannot see present need for solvent control at the national level.

Our comments today have been couched in rather general terms, and have related more to concepts of abatement policy than to specific legislative draftsmanship.

If we can be of any assistance in this regard as your consideration of this legislation proceeds, we would be glad to have you call upon us.

We thank you for the opportunity of presenting these views, and assure you that they have been offered in the sincere hope that they will help in the formulation of legislation effective in furthering our cooperative efforts to restore and preserve the quality of the air we all seek to enjoy.

Senator Boggs. Thank you, Mr. Bixby. Your statement is ably put together and presented. I know it will be of great help to the committee. The committee will give your suggestions and your thoughts every consideration.

You raise many questions, of course. But you definitely, except under certain circumstances, oppose national ambient air quality standards, as I understand it.

Mr. BIXBY. Senator, no. I am sorry if I gave that impression.

We do not wish to oppose national air quality standards. I think the point we would like to make is that even if air quality standards are developed on a national basis, the implementation of these standards is more properly a problem that is related to the regional basis.

Senator Boggs. Region or State, or both?

Mr. BIXBY. Yes.

Senator Boggs. With a hearing?

Mr. BIXBY. Yes, with a hearing. This would be helpful.

Senator Boggs. On page seven you discuss emissions that are of extreme hazards. It is my understanding that this is designed to affect asbestos plants and similar industries, not the AEC licensed plants. Do you have any thoughts under that circumstances?

Mr. BIXBY. Senator, I don't have any particular knowledge of the asbestos industry. Perhaps Dr. Johnson may have a comment he would like to make in this regard.

Senator Boggs. Dr. Johnson?

Mr. JOHNSON. The potential industrial hygiene hazard of asbestos fibers is widely accepted today. This knowledge is a recent development. The need for Federal control of sources from an air pollution viewpoint has been explored less in detail.

Our Association does not represent the asbestos manufacturers. We have not developed a consensus on that and I don't think it would be

appropriate for us to offer specific comments on the regulation of some other industry.

Senator Boggs. Thank you.

On page nine, you refer to certificates of compliance. I would point out that a water pollution bill we will soon send to the President, H.R. 4148, requires licensing before construction of plants that intend to pour effluents into interstate bodies of water.

Why would such compliance standards for air pollution not also be useful?

Mr. Bixby. I don't think I quite got the question.

Senator Boggs. Certification is a better word, probably.

In your statement, you refer to certificates of compliance. I pointed out that a Water Pollution Bill that just got out of conference, requires certification—I used the word “licensing”—before construction of plants pouring effluents into navigable bodies of water.

Why could such certification for air pollution not be useful?

Mr. Bixby. I think there are several aspects of this problem that make the situation perhaps more complicated than the situation that exists in the case of water pollution control.

There are certainly many, many sources of contaminants admitted to the atmosphere from many different processes, and the characteristics of the contaminants in the emissions are vastly different.

I think there would be a real problem in developing meaningful devices to cover the vast multitude of cases that would be encountered if we tried to apply this completely to all emissions from all processes in all circumstances.

Senator Boggs. I don't know whether you were here or not when Dr. Lenher testified. He read a statement by Dr. McGee indicating that lead was potentially less harmful than the aromatic compounds that would replace lead if lead was taken out of gasoline.

Do you have any comment on that?

Mr. Bixby. I don't have any comment. I have read numerous reports and opinions on the effects of lead, and I have no opinion.

I am quite confused on this point.

Senator Boggs. There has been a lot of testimony on it, and more will be taken.

Mr. Bixby. It is a very complex problem.

Senator Boggs. In connection with your statement that more electricity would be needed to take particulates out of the smokestack exhaust, I note that the power plants also would have to have pollution control devices. Therefore, the net effect remains less pollution, does it not?

Mr. Bixby. I am not sure that that would be a necessary conclusion. It would depend, I think, on whether the efficiency of the control devices that the power plant would be employing would be better, more efficient, than the devices that would be used in the particular plant that would use this greater amount of electricity.

It would be a balancing of what you gain in one place against what you lose in another place.

I think perhaps generally speaking, with a large power plant, there might be somewhat better efficiency for their pollution control devices, but I cannot say unequivocally that this would be the case. However, each additional kilowatt expended in the scrubber collects an ever

smaller increment of particulates, while each such power increment produces a linear increase in emissions at the power plant. Inevitably we reach a point at which further increases in control at the plant result in an increase in total pollution.

Senator Boggs. In your testimony, you say that if the current machinery for the establishment of these regions and their control agency is too cumbersome, perhaps it may be streamlined, "but we do not believe that it would be helpful to abandon the progress that has already been made in creating a body of regional authorities to cope with regional problems."

I think that was what Senator Cooper in his questioning the other day was getting at. It might be possible to retain the regional steps that have been taken already, and also to have national standards.

Mr. BIXBY. We feel very strongly this way, Senator. We feel there has been a great deal of progress made in the regional approach and it would be a shame to lose this.

Senator Boggs. But there would be something to be gained if we kept this, and also went to national standards.

Mr. BIXBY. I think this may very well be true.

Senator Boggs. Between the two, however, you are inclined to stick with the regional approach. Is that correct?

Mr. BIXBY. Our feeling is that the regional approach should not be abandoned because there are specific characteristics of certain regions, and I think it is proper that those regions consider their own problems and implement the standards, even if they are national standards.

They should be implemented on a regional basis because of their particular situations.

Senator Boggs. You have the feeling they can't be implemented effectively at the national level?

Mr. BIXBY. I wouldn't say it quite that way. I think they could be more effectively implemented at the regional level.

Senator Boggs. You also say on page 7, "Uniform national emission standards are not justified in either economics or engineering."

Mr. BIXBY. Perhaps I misunderstood you. We are talking now about emission standards and not ambient air quality standards.

My reference was to the fact that ambient air quality standards, even if applied on a national basis, should be implemented on a regional basis.

This is different from national emission standards.

Senator Boggs. This is emission standards from stacks as well as automobiles.

Mr. BIXBY. Yes. Well, both moving sources and stationary sources have emissions.

Senator Boggs. I certainly thank you for appearing. Your very excellent presentation will be helpful to the committee, I am sure.

Senator Baker.

Senator BAKER. Mr. Chairman, let me say for the record that I found it necessary to leave during the witness' testimony. I must say, however, that I have read his statement carefully in its entirety.

There are many points that are well taken and many with which I would disagree.

However, I think our time is very limited now and maybe at a later point we will have another opportunity to discuss this with the witness.

Thank you.

Senator BOGGS. Thank you very much, Mr. Bixby and Dr. Johnson. We appreciate your presentation.

Mr. BIXBY. Thank you, Mr. Chairman.

Senator BOGGS. The committee will recess until March 23, at 9:30.

(Whereupon, at 11:50 a.m. the subcommittee recessed, to reconvene at 9:30 a.m., Monday, March 23, 1970.)

AIR POLLUTION—1970

MONDAY, MARCH 23, 1970

U. S. SENATE,
SUBCOMMITTEE ON AIR AND WATER POLLUTION
OF THE COMMITTEE ON PUBLIC WORKS,
Washington, D.C.

The subcommittee met at 9:50 a.m., pursuant to recess, in room 4200, New Senate Office Building, Hon. Edmund S. Muskie (chairman of the subcommittee) presiding.

Present: Senators Randolph, Muskie, and Dole.

Also present: Barry Meyer, counsel; Thomas C. Jorling, minority counsel, Leon Billings and Richard Grundy, professional staff members; Adrien Waller and Jerry Edgerton, staff members.

Senator MUSKIE. The committee will be in order.

Our first witness this morning will be Congressman Abner J. Mikva, of Illinois.

STATEMENT OF HON. ABNER J. MIKVA, A REPRESENTATIVE IN THE U.S. CONGRESS FROM THE SECOND CONGRESSIONAL DIS- TRICT OF ILLINOIS

Representative MIKVA. Senator Muskie, members of this distinguished subcommittee, it is a pleasure to appear before you. I would like to emphasize the importance of public participation in the formulation and administration of air pollution control standards.

As you know, present law contains requirements for public participation—public hearings—before adoption of regional ambient air quality standards under the Air Quality Act of 1967. By requiring public hearings, Congress sought to insure that the record on which air quality standards are based—and which the Secretary uses for review and approval of those standards—represented a broad spectrum of public or community opinion. The National Air Pollution Control Administration (NAPCA) of the Department of HEW informs me that despite scepticism by air pollution experts and technicians, public participation has made important contributions to the standard-setting process in many areas. Based on the first 15-month experience, the public is both anxious and able to participate actively in the formulation of air quality standards.

Approximately 36 public hearings on community air quality goals have been conducted or are scheduled for the immediate future. Attendance has been startling, ranging up to 2,500 (Cleveland). The effect of this participation is demonstrated by my own State of Illinois announced in an Illinois Air Pollution Control Board press release:

(619)

Today's action moves up the deadline date from 1974 to 1972 and reduces the permissible amounts of sulfur dioxide and particulate matter. Interim goals were eliminated with the establishment of the 1972 deadline. The action stemmed from hearings conducted Aug. 5 in Chicago and Aug. 12 in Edwardsville. (Illinois Release No. 1436, Aug. 28, 1969).

Thus far, active public participation has resulted—without exception—in the establishment of more broadly acceptable and more stringent standards than either were or would have been proposed.

I submit that the record to date under the public hearing requirements of the 1967 act justify not only continued emphasis on public participation in the standard-setting process, but a large public role in overseeing the administration of standards once they are determined. There are a number of reasons to justify such a public role. Let me summarize them.

First, public participation stimulates a useful dialog among private citizens, citizens groups, and officials of local, State, and Federal air pollution control agencies. The character and intensity of these dialog will probably vary greatly depending on the seriousness of local air pollution problems, the ability of local citizens to organize effectively, and the responsiveness of State and local officials. The most important factor, however, is the encouragement of citizen involvement. Air pollution—like other environmental quality problems—has a characteristic which many public policy issues do not share: the ability to stimulate impassioned public interest. We in Government cannot afford to ignore or waste that kind of public interest. Especially when our institutions or Government are being subjected to close scrutiny and are regarded with scepticism, we need to put to work citizen enthusiasm wherever we can find it.

Second, citizens and other public interest groups may often be better informed about the technology of air pollution control than the industries to whom the standards will most directly apply. Certainly, such groups will be more likely to place the limitations of present technology in perspective, rather than to regard them as absolute barriers beyond which we can never hope to advance. Moreover, large membership organizations like the United Steel Workers Union, the National Tuberculosis and Respiratory Disease Association, and the National Wildlife Federation may have research resources which are equal to those of industry and Government. Even from a technical point of view, we cannot afford to be without the benefit of the suggestions of these public interest representatives.

Finally, I submit that the decisions which are made in formulating and administering air pollution control standards are not at bottom technical decisions at all. In some respects they may be influenced by technical considerations, but in reality they are public policy decisions in the classic sense. Most often, they involve tradeoffs among many factors: Higher costs to industry, restricted production, higher consumer costs, restrictions on land use, and so forth. These are decisions which in our kind of society most emphatically need public participation. They are decisions in which those most directly involved may not—probably are not—always best qualified to give advice and make recommendations. The public interest is likely to emerge from the process only if all kinds of inputs are considered and weighed. And this applies to enforcement proceedings as well as to standard-setting proceedings.

By emphasizing the importance of public hearings and public par-

ticipation in standard-setting and enforcement proceedings, I do not mean to indicate that these alone are sufficient. In order for public participation in standard-setting hearings to be meaningful, there must be adequate advance notice of proposed standards and adequate time to prepare comment. The proposed standards should be accompanied with a reasonably complete explanation of their economic, social, and political implications so that even those citizens' groups without their own experts can participate intelligently. Ideally, initial announcement of proposed standards would contain some indication of the underlying decisions—economic, social, and political—which make those standards desirable and make others impractical or unsafe.

Second, the procedures through which public participation is encouraged and perhaps even financed should not be too rigid. Some of the most valuable contributions may well come from groups which at first glance have no expertise or no relation to the geographical area in question. The National Air Pollution Control Administration should be given some freedom to encourage public participation through contracts, through financing of printed studies, and through support of the activities of community air pollution control groups. In other words, I believe the simplest legislative solution is a statement in general terms of congressional intention that public participation of all varieties is to be encouraged. After this general statement of policy and objectives, the details should be left to NAPCA to work out the best means for achieving the result Congress desires. Needless to say, NAPCA's performance in this respect would be subject to continual congressional oversight.

Environmental quality, and air pollution control specifically, are issues which are rare in their ability to provide public interest and concern. Public participation in the formulation and enforcement of air pollution control standards can make valuable technical contributions. But equally important is the process of citizen involvement based on public interest and concern. This is a process which in our world of gigantic, ongoing bureaucracies with lives of their own, we often forget. But in a democratic society it is still the basis of government. I believe that in the legislation which you are now considering we must preserve public participation in the process of setting and enforcing pollution control standards.

Senator MUSKIE. Thank you, Congressman Mikva. We are glad to have your statement for the record.

Our next witness is James Moorman of Washington, D.C. It is a pleasure to welcome you this morning. I appreciate your interest in testifying.

STATEMENT OF JAMES MOORMAN, ESQ., WASHINGTON, D.C.

Mr. MOORMAN. Thank you, Mr. Chairman and members of the committee.

I am a practicing attorney and a member of the Bars of the District of Columbia and the State of New York. I am appearing at the committee's request as a private citizen and as an attorney who has had some experience with private suits to protect the environment.

I will restrict my remarks to that part of Senate Bill 3546 (pages 16-17) which amends Section 108(c) of the Clean Air Act, by adding the following provision:

(13) The district courts of the United States shall have original jurisdiction, regardless of the amount in controversy or the citizenship of the parties, of civil actions brought by one or more persons on behalf of themselves or on behalf of any other persons similarly situated within any air quality control region or portion thereof designated under Section 107 against any person including a governmental instrumentality or agency, for declaratory and equitable relief or any other appropriate order against any person, where there is an alleged violation of any applicable air quality standards, plan for implementation or emission requirements established pursuant to this section. Nothing in this subsection shall affect the rights of such persons as a class or as individuals under any other law to seek enforcement of such standards.

I would like to state at the outset that I am very much in favor of this provision, which I would like to think of as a "private attorneys general provision."

I believe, if passed, the provision will materially speed up the process of restoring our nation's air quality. If such a provision were to be added to our water pollution laws and other environmental protection and resource conservation laws, we might well see unexpected and needed progress along the whole broad front of the battle to preserve the environment.

The fact that up to now the citizen has not been given a strong means to obtain enforcement is a major flaw in laws such as the Air Quality Act. Experience has taught us that we cannot rely solely on government officials alone to get the job done. The reasons for this are many. To list a few:

Administrators are given too many jobs for the amount of money appropriated. Enforcement is an unpleasant task and so it often is put at the bottom of the list.

Whenever the government acts, politics are involved. There is no way for administrators to escape politics. As a result, political considerations often slow enforcement. For example, a polluter may be an important employer that will use its political position to prevent enforcement.

Sometimes administrative agencies become captured, at least in spirit, by those they should regulate. The causes of this process are several and have often been remarked upon.

Bureaucracies being what they are and always will be, they just will not hurry.

The private attorneys general provision will bring the citizen into enforcement in a dramatic and effective way. It will ensure, I believe, that many air pollution problems that are being neglected will no longer be neglected. What is more, it will give the frustrated citizen who feels something must be done an opportunity to do something constructive.

In particular, I would like to point out what I believe are the strengths of the Private Attorneys General provision and in addition, include suggestions to improve it.

First, the provision provides jurisdiction in the Federal District Courts without regard to the amount in controversy. This is proper because "amount in controversy" has no real meaning in an air pollution suit. It is impossible to measure with regard to an individual. If measured from the defendant's point of view, it is still not obvious what measure to use.

Secondly, the provision allows, but is not restricted to, class actions. Thus any citizen or conservation group will have standing to bring

suit and may, if it chooses, avoid the technicalities of class action suits.

Third, governmental agencies are included within the class of suable defendants. This means that the government will not be able to hide behind the doctrine of Sovereign Immunity which often prevents orders to federal officials to act.

Four, the provision provides for declaratory and injunctive relief (including, as I read "any other appropriate order," mandatory relief under 28 U.S.C. Section 1361). It does not, however, provide for damages. I have some reservations about whether this will be sufficient.

I see no advantage to society in punishing industries for their past sins at this stage when we are changing and upgrading standards. The action for damages, however, could be a powerful incentive to an additional segment of the bar to bring antipollution suits that might otherwise lack counsel.

Such actions involve, of course, difficult questions of the measure of damages. However, because the Private Attorneys General provision as now proposed may not stimulate enough private suits, I would favor broadening it to include actions for damages.

Five, the Private Attorneys General provision is particularly useful because the plaintiff will only have to show that the defendant is violating an applicable air quality standard, an implementation plan or an emission requirement under the Air Quality Act. Legal barriers to common law nuisance and similar actions should not be a factor in suits under the provision. The provision, however, specifically preserves such actions. This is fortunate, because there are circumstances when they are useful.

Six, the Private Attorneys General provision has an omission upon which I would like to comment. It is silent on the burden of proof. I believe that the burden of proof should shift to the defendant after the plaintiff makes a prima facie showing of a violation.

I hope that the courts will so treat the burden of proof in light of the fact that plaintiffs will in all cases simply be trying to hold defendants to standard requirements of the Air Quality Act they are legally bound to follow.

In conclusion, let me say again that I am greatly in favor of the Private Attorneys General provision and I hope similar provisions will in the future appear in all environmental protection bills.

Senator MUSKIE. Thank you very much, Mr. Moorman, for your testimony on what we regard as a very important part of this bill.

With respect to your last point, do you have any doubt that the courts would find that the burden of proof shifts after a showing by the plaintiff?

Mr. MOORMAN. I think that things of that nature are always in doubt unless they are spelled out. Lawyers make good arguments and we can expect the attorneys for the polluters to make their good arguments to the Courts.

Senator MUSKIE. I don't suppose there are any precedents for the kind of language you would suggest in here.

Mr. MOORMAN. I am not aware of any, sir.

Senator MUSKIE. On the question of damages, do you have any thoughts on what the measure of damages might be if a damages section were provided?

Mr. MOORMAN. As I say, that is a very difficult question. It is very difficult to link one polluter's activities to an individual's emphysema, although we know statistically that it must be linked.

I would really hesitate to try to get into that thicket here because I think that it will take some hard thought.

Senator MUSKIE. For us, too.

Mr. MOORMAN. I would certainly hope that the damages would be at least as expensive as the cost of installing clean-up equipment.

Senator MUSKIE. We would not want to eliminate the resources necessary to install clean-up equipment.

Have you given any thought to the kind of evidence that might be admitted in these suits and what their probative value ought to be? For instance, on the question of data on emissions, should they be made available by a polluter to be binding evidence?

Mr. MOORMAN. I think that under the federal rules of civil procedure that any data that the polluter has should be discoverable by a plaintiff, unless, of course, it involves some privilege ordinarily protected by the rules. Just off hand, I cannot think of such a privilege.

Senator MUSKIE. With respect to your own experience in this field, Mr. Moorman, you said you have had some experience as an attorney in private suits to protect the environment.

Mr. MOORMAN. Yes.

Senator MUSKIE. What have the results been? How extensive has it been?

Mr. MOORMAN. I have not been in this field very long and I must say that most of the results still hang in balance. I have been deeply involved in DDT litigation. I have observed that some suits have recently been successful in other areas, suits to, for example, protect forest resources from mismanagement by the Forest Service and attempts to protect the Hudson River from what I think is an unwise expressway.

The Court felt the desire to give the citizens standing in those cases. I also observed that the Court of Appeals for the State of New York came down last week with a decision in airpollution in which it granted damages on a continuing basis from the polluter, a cement company, but ruled that he could continue to pollute the air. I don't know what the measure of damages were that were awarded in that case. I feel that case illustrates why the mandatory injunction, as well as damages are necessary. One without the other probably will not have the results desired.

Senator MUSKIE. Have you had occasion to write briefs to support the concept of citizens' suits under present law?

Mr. MOORMAN. Yes, sir, I have written briefs on the concept of standing in particular. I have written a couple of briefs on that.

Senator MUSKIE. It would be useful to this committee to have available copies of those briefs.

Mr. MOORMAN. I would be delighted to supply the committee with copies of those briefs. I would like to note that the government is still contesting the question of standing in these cases.

The Supreme Court, in dictum, a couple of weeks ago, may have liberalized it in the Associated Data Processors Services Association case, but the government apparently intends to continue to raise the issue.

Senator MUSKIE. We would like to have copies of those briefs for our record. I would like to ask the staff to include in the record the Supreme Court dictum and the New York decision to which you referred.

(The briefs referred to follow:)

IN THE
UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 23,812

THE ENVIRONMENTAL DEFENSE FUND, INC., IRENE LOPEZ,
ELVIRA GARDUNO, KATHY RADKE, MARILYN VITTOR,
LEIGH ROYCROFT, and JUAN ZAMORA,
Petitioners,

v.

ROBERT H. FINCH,
Secretary, Health, Education and Welfare,
Respondent.

ON PETITION FOR REVIEW OF AN ORDER OF THE
SECRETARY OF HEALTH, EDUCATION, AND WELFARE

BRIEF FOR PETITIONERS

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TABLE OF CONTENTS

	<u>Page</u>
Questions Presented	1
Statement Pursuant to Rule 8(d)	2
References to Rulings	3
Statement	3
A. Nature of this Proceeding	3
B. The Statutory and Regulatory Scheme	4
C. The Petitioners	5
D. Prior Proceedings	6
1. The Petitioner	6
2. The Mrak Commission Report	7
3. The Secretary's Decision	8
Statutes and Regulations Involved	9
Argument	
Introduction and Summary	9
I. Substantial Evidence Establishes that DDT is a Cancer-Producing Substance; Accordingly, the Secretary Must Act Immediately to Prohibit Residues of that Poison on Raw Agricultural Commodities	11
A. The Secretary must Prohibit Residues of Cancer-Producing Substances on Raw Agricultural Commodities	11
1. The Anticancer Principle and Its Effect	11
2. The Anticancer Principle is Fully Applicable to Pesticide-Chemicals	16
a. The Secretary, by contemporaneous administrative construction, has construed the Delaney principle as being fully applicable to the pesticide provision	17

b. Congress intended for the Delaney principle to apply to the Food, Drug and Cosmetic Act generally, including the pesticide provision	24
B. The Record Establishes that DDT is a Carcinogen	29
1. The Evidence Presented to the Secretary by Petitioners Establishes that DDT is a Carcinogen	29
2. The Report of the Mrak Commission Corroborates Conclusively the Finding that DDT is a Carcinogen	30
C. The Secretary has Utterly Failed to Comply with the Act	32
II. Petitioners Presented "Reasonable Grounds" In Support of Their Petition; Accordingly, it was Incumbent upon the Secretary to at Least Publish their Proposal in the <i>Federal Register</i> thereby Initiating the Administrative Procedures	34
Conclusion	40

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<i>Environmental Defense Fund, Inc., et al. v. Clifford M. Hardin</i> , CADC No. 23813	2
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Section 408 4

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page 42	13
page 44	13
page 53	13
page 61	13
page 62	24
pages 61-63	13
pages 63-69	21
page 74	13, 24
page 87	13
pages 89-90	21
pages 94-95	13
pages 95-96	23
page 107	27
page 108	12
page 172	28
page 182	28
page 183	28
page 378	22
pages 384-385	22
page 501	13, 15, 24

page 506	24
page 507	13
page 508	24
page 513	24
page 514	15
page 517	15
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IN THE
UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 23,812

THE ENVIRONMENTAL DEFENSE FUND, INC., IRENE LOPEZ,
ELVIRA GARDUNO, KATHY RADKE, MARILYN VITTOR,
LEIGH ROYCROFT, and JUAN ZAMORA,
Petitioners,

v.

ROBERT H. FINCH,
Secretary, Health, Education and Welfare,
Respondent.

ON PETITION FOR REVIEW OF AN ORDER OF THE
SECRETARY OF HEALTH, EDUCATION, AND WELFARE

BRIEF FOR PETITIONERS

QUESTIONS PRESENTED

It is uncontroverted that the pesticide-chemical DDT causes cancer in test animals and is responsible for wide-spread environmental degradation including damage to non-target organisms of many species, the preservation of which is essential to the well being of man. In response to evidence to this effect the Secretary of Health, Education, and Welfare not only refused to take immediate action to prohibit the further contamination of raw agricultural commodities with

DDT, he refused to even publish notice of petitioners' proposal in the *Federal Register*, thereby denying them access to the administrative procedures available under the Food, Drug and Cosmetic Act.

The questions presented are:

(1) Whether the Secretary must act immediately to prohibit the continued contamination of raw agricultural commodities by a pesticide-chemical which is established to be cancer-producing; and

(2) Whether, in view of the showing that DDT is a carcinogen and a hazard to human health generally, the Secretary properly could find that petitioners' had not presented "reasonable grounds" in support of their request that existing tolerances for DDT be repealed.

STATEMENT PURSUANT TO RULE 8(d)

Preliminary matters have already been considered and disposed of by the Court in this proceeding. Simultaneous with the filing of its Petition for Review, petitioners filed a "Motion to Advance on the Docket and to Expedite" consideration of this proceeding. On January 14, 1970, Judge McGowan directed that a request for an extension of time filed by respondent be treated as respondent's opposition to petitioners' Motion. On January 29, 1970, a panel of the Court consisting of Chief Judge Bazelon and Judge Robinson granted petitioners' motion, specified an expedited briefing schedule and directed the Clerk to set this proceeding down for early argument.

The same panel of the Court, also on January 29, 1970, directed the parties in No. 23813 (*Environmental Defense Fund, Inc., et al., v. Clifford M. Hardin*) to comply with the same expedited briefing schedule and instructed the Clerk to schedule the matter for early argument. Petitioners there challenge the failure of the Secretary of Agriculture to take actions under the Federal Insecticide, Fungicide and Roden-

ticide Act (61 Stat. 163, as amended, 7 U.S.C. 135, *et seq.*), to suspend and cancel the registrations of economic poisons containing DDT.

REFERENCES TO RULINGS

In this proceeding petitioners seek review of a determination by the Secretary of Health, Education, and Welfare under the Food, Drug and Cosmetic Act, 52 Stat. 1040, as amended, 21 U.S.C. 301, *et seq.* This case comes to the Court as a result of the Secretary's refusal, announced on December 8, 1969, immediately to prohibit residues of the chemical-poison DDT on raw agricultural commodities. The Secretary's decision which is challenged in this Court is set forth at pp. 8-9 of this brief in the Joint Appendix at page A-98.

STATEMENT

A. Nature of this Proceeding

DDT is one of the most popular and widely studied of the pesticides.¹ It has been recognized for some time that DDT represents an extreme ecological hazard and, more recently, that it is cancer-producing in test animals. Petitioners, relying on evidence of these hazards, requested the Secretary to act now to protect the public health and well-being by eliminating the unnecessary ingestion of that poison.

The Commissioner of Food and Drugs, acting for the Secretary and without disputing the scientific evidence that DDT is a carcinogen and an environmental hazard generally, denied the petition refusing even to publish notice of petitioners' proposal in the *Federal Register* thereby depriving them of access to the administrative process.

¹"DDT", is a mixture of substances which has as its major ingredient the chemical compound 1,1,1-trichloro-2,2-bis-(p-chlorophenyl) ethane. DDT is widely used as a pesticide in a variety of economic poisons.

B. The Statutory and Regulatory Scheme

Petitioners filed their request for administrative action pursuant to Section 408 of the Food, Drug and Cosmetic Act, 21 U.S.C. 346a (hereinafter referred to as "Act"),² the pesticide provision. Essentially that provision precludes the use on raw agricultural commodities of pesticide-chemicals which are not generally recognized by "experts qualified by scientific training and experience" as being safe unless they are used within tolerance limits prescribed by the Secretary or pursuant to an exemption order. In establishing tolerances the Secretary is to give appropriate consideration to, among other factors, "the necessity for the production of an adequate, wholesome, and economical food supply [and] to the other ways in which the consumer may be affected by the same pesticide chemical or by other related substances that are poisonous or deleterious." (Section 408(b), 21 U.S.C. 346a(b)). Where "the scientific data before [him] does not justify the establishment of a greater tolerance" the secretary may establish the tolerance at zero. (*ibid.*)

Tolerances have, over the years, been established for DDT residues on scores of raw agricultural commodities ranging from a tolerance level of zero to a high of 7 parts per million. See 21 CFR 120.147-120.147c.³ However, under the regulations an interested person may request the repeal of existing tolerances and if "reasonable grounds" are presented in support of such a request the petitioner is entitled to have his proposal noticed in the *Federal Register* and otherwise to enjoy the protection of the administrative procedures. 21 CFR 120.32.

The instant case also involves application of the so-called Delaney anticancer amendment which requires the Secretary

²Section 408, as well as the other relevant portions of the Act, are set forth in the Supplement to this brief.

³The relevant portions of the regulations are similarly included in the Supplement to this brief.

to prohibit the use of any chemical or additive which is shown to be capable of inducing cancer in test animals. The amendment is contained explicitly in the food additives section of the Act (Section 409(c)(3)(A), 21 U.S.C. 348(c)(3)(A)) and in the color additives section. (Section 706(b)(5)(B), 21 U.S.C. 376(b)(5)(B)).

C. The Petitioners

Petitioner, The Environmental Defense Fund, Incorporated (hereinafter "EDF"), is a nonprofit, tax-exempt membership corporation organized under the laws of the State of New York. EDF is made up of scientists and other citizens dedicated to the protection of man's environment, employing legal action where necessary. EDF has, through litigation, sought to protect the environment from various forms of pollution. Its Scientists Advisory Committee, with more than 200 members, including some of the world's foremost environmental scientists, assures that positions taken are thoroughly supported by scientific evidence. In its activities, EDF does not concern itself with the pecuniary interests of individuals; rather, it seeks to assure the preservation or restoration of environmental quality on behalf of the general public.

Petitioners Irene Lopez, Elvira Garduno, Kathy Radke, Marilyn Vittor and Leigh Roycroft are young mothers who have in the past, do presently, or intend in the future to nurse their children. It is an established fact, recently confirmed by the Commission on Pesticides and Their Relationship to Environmental Health,⁴ that mothers' milk contains excessive amounts of DDT residues to the point where breastfed babies as a general rule are subjected to twice the maximum average daily intake of DDT recommended by the United Nation's World Health Organization (App. B-26, 27).⁵

⁴The so-called Mrak Commission.

⁵"App." references are to the separately bound Joint Appendix.

Petitioner Juan Zamora, the father of eight minor children, is an agricultural worker and as such is required to come into frequent contact with pesticide poisons. Again, the Mrak Commission corroborates that the dangers of DDT are considerably greater for those who must come into repeated contact with it as a consequence of their occupations (App. B-62, 63).

All of the individual petitioners reside in California, each is a consumer of food products, including raw agricultural commodities which contain residues of DDT, and each is economically disadvantaged.^{5-A}

D. Prior Proceedings

1. *The Petition*

On October 7, 1969, a petition was filed requesting the issuance of a regulation repealing the tolerances for DDT on raw agricultural commodities. The petition was premised on the fact that DDT has been demonstrated to be cancer-producing in test animals with circumstantial evidence suggestive of possible carcinogenic effects in humans as well. Petitioners submitted, in support of their contentions, a comprehensive study recently completed under the sponsorship of the National Cancer Institute (the so-called *Innes* report)⁶ which lays to rest any doubt as to the carcinogenicity of DDT in test animals. Additionally, petitioners submitted an earlier study which shows the carcinogenic potentialities of DDT when ingested by test animals over prolonged periods at dosage levels which approximate those to which the urban population is exposed,⁷ and a study which

^{5-A}The Mrak Commission found that the hazards of DDT are compounded in the face of nutritional inadequacies.

⁶*Bioassay of Pesticides and Industrial Chemicals for Tumorigenicity in Mice: A Preliminary Note*, J. R. M. Innes, *et al.*, 41 *Journal of the National Cancer Institute* 1101 (June, 1969) (App. A-14).

⁷*Investigations on the Effects of Chronically Administered Small Amounts of DDT in Mice*, Kemeny and Tarian, 22 *Experientia* 748 (1966) (App. A-28).

suggests that DDT may well have carcinogenic effects in man.⁸

On October 31, 1969, petitioners submitted a supplemental filing requesting expedited action by the Secretary directed at prohibiting the continued presence of DDT in raw agricultural commodities. In recognition of the fact that the environment is already contaminated with DDT, thereby posing practical problems with respect to the realization of a zero tolerance, petitioners suggested action which the Secretary reasonably could take at this time so as to rid our food supply of DDT at the earliest date possible—the establishment of zero tolerance levels but exempting from seizure any commodities that contain residues arising from the application of DDT prior to the repeal of existing tolerances.

2. *The Mrak Commission Report*

In December, 1969, the Secretary received the final report of the Mrak Commission. In that report the Commission stated that “the evidence for the carcinogenicity of DDT in experimental animals is impressive and the [Technical Panel on Carcinogenesis] takes no exception to the conclusions as to DDT recorded in the JNCI report of the National Cancer Institute study” (the *Innes* study) (App. B-41).

The Commission reported that DDT residues are established nerve toxins and that they have acute effects on the central nervous system (App. B-21, 22, 25). More specifically, that DDT residues are responsible for the induction of metabolizing enzymes in the liver thus “alter[ing] the susceptibility to drugs or other chemicals that are normally metabolized by these enzymes” (App. B-61) and may, merely as a consequence of their accumulation in fatty tissue, “constitute a health hazard” (App. B-27).

⁸*Pesticide Concentrations in the Liver, Brain and Adipose Tissue of Terminal Hospital Patients*, J. L. Radomski, W. B. Deichmann, E. E. Clizer, 6 Food Cosmetics and Toxicology 209 (1968) (App. A-30).

Finally, after detailing the adverse effects of DDT residues on phytoplankton, beneficial insects, marine invertebrates, fish, birds and mammals (App. B-15), in some cases destroying entire species (App. B-8, 9, 15-17) the Commission warned (App. B-8):

Man is an integral part of the living system, which includes about 200,000 species in the United States. Most of these are considered to be essential to the well-being of man. Pesticides are now affecting individuals, populations, and communities of natural organisms. Some, especially the persistent insecticidal chemicals such as DDT, have reduced the reproduction and survival of nontarget species.

3. The Secretary's Decision

By letter dated December 8, 1969, Herbert L. Ley, Jr., M.D., Commissioner of Food and Drugs, acting for the Secretary, advised petitioners that their request had been denied (App. A-98):

This refers to Pesticide Petition No. OEO894, requesting that zero tolerances be established for residues of DDT on raw agricultural commodities.

In a report to the Secretary of Health, Education, and Welfare, dated November 1969, the Commission on Pesticides and Their Relationship to Environmental Health recommends the elimination of all non-essential uses of DDT, i.e., its use be limited to the prevention or control of human disease and other essential uses for which there are no alternatives available. However, the Commission recognized that unavoidable residues of DDT from past uses will continue to be present in the soil, water, air and food supplies for a period of years, and thus that it is not practical to attempt to eliminate the residues of persistent pesticides from food by the establishment of zero tolerance limits. Plans are currently being developed to implement this recommendation of the Commission. We enclose a copy of the White House

announcement of the Environmental Quality Council's review of the report by the Commission on Pesticides. We believe the steps outlined are the most reasonable steps that should be taken at this time.

In the absence of a showing that establishing the zero tolerances you request would be practical, we find that you have not presented reasonable grounds to support the proposed action. Accordingly, a proposal based on the above petition is not being published.

The announcement of the Environmental Quality Council, relied upon by Dr. Ley, does not state that any affirmative action will be taken by the Secretary in response to the DDT menace.

STATUTES AND REGULATIONS INVOLVED

The pertinent parts of the Food, Drug and Cosmetic Act, 52 Stat. 1040, as amended, 21 U.S.C. 301, *et seq*, and of the administrative regulations promulgated in implementation of that Act, 21 CFR Part 120, are set out in the Supplement to this brief.

ARGUMENT

INTRODUCTION AND SUMMARY

In testing the propriety of any action by the Secretary of Health, Education, and Welfare under the Food, Drug and Cosmetic Act, it is appropriate to focus first on the overriding objective sought to be accomplished by the Congress when it passed that legislation: protection of the health and welfare of the consuming public.

As stated by former Secretary Arthur S. Flemming, "there is one thing that a responsible government cannot do. It cannot fail to place at the top of its list of priorities the health of all of the people even though by so doing it may be or may appear to be acting against the economic interests of

a segment of our society. The government's paramount obligation to act in the interest of the health and safety of the people in administration of the food and drug laws was ably set forth by Justice Frankfurter"⁹ when he said:

The Food and Drug Act of 1906 was an exertion by Congress of its power to keep impure and adulterated food and drugs out of the channels of commerce. By the act of 1938, Congress extended the range of its control over illicit and noxious articles and stiffened the penalties for disobedience. *The purposes of this legislation thus touch phases of the lives and health of people which, in the circumstances of modern industrialism, are largely beyond self-protection. Regard for these purposes should infuse construction of the legislation if it is to be treated as a working instrument and not merely as a collection of English words.* [*United States v. Dotterweich*, 320 U.S. 277, 280, emphasis added.]¹⁰

Confronted with a critical health problem which is completely "beyond self-protection" by the individual, the Sec-

⁹Hearings on H.R. 7624 and S. 2197 before the House Committee on Interstate and Foreign Commerce, 86th Cong., 2d Sess. p. 42, hereinafter referred to as "*Hearings*."

¹⁰See, also: 62 *Cases of Jam v. United States*, 340 U.S. 593, 596; *United States v. Sullivan*, 332 U.S. 689, 696; *United States v. Two Bags, Each Containing 110 Pounds, Poppy Seeds, et al.*, 147 F.2d 123, 127 (C.A. 6, 1945); *C. C. Co. v. United States*, 147 F.2d 820 (C.A. 5, 1945); and *United States v. 30 Cases, Etc.*, 93 F. Supp. 764, 768-769 (S.D. Iowa, 1950).

In *C. C. Co. v. United States*, *supra*, the Fifth Circuit, in upholding condemnation of partially decomposed oysters, recognized (147 F.2d at 824):

That statutes enacted for the public good and to suppress a public wrong, although they impose penalties or forfeitures, are not to be construed strictly in favor of the defendant but should be fairly and reasonably construed so as to carry out the intention of Congress. The Federal Food, Drug and Cosmetic Act was enacted in the interests of the public welfare to protect the public health, and the courts must give it effect according to its terms.

retary not only took a most restrictive reading of his responsibilities under the Act, he also completely foreclosed utilization of the administrative process.

As we show, where it is established that a pesticide-chemical is cancer-producing, the Secretary has no discretion but to immediately take all steps necessary to protect the public from the continued ingestion of that poison. It is uncontroverted that DDT is a carcinogen. Moreover, it is uncontroverted that DDT, wholly apart from its cancer causing effects, represents an acute hazard to the human liver and central nervous system and is seriously threatening a complete disruption of the entire biosphere through its adverse effects of the survival of many of the species which are considered to be essential to the well-being of man.

In the face of this showing, it was incumbent upon the Secretary to move now to rid our food supply of residues of DDT.

I

SUBSTANTIAL EVIDENCE ESTABLISHES THAT DDT IS A CANCER-PRODUCING SUBSTANCE; ACCORDINGLY, THE SECRETARY MUST ACT IMMEDIATELY TO PROHIBIT RESIDUES OF THAT POISON ON RAW AGRICULTURAL COMMODITIES

A. The Secretary must Prohibit Residues of Cancer-Producing Substances on Raw Agricultural Commodities

1. The Anticancer Principle and Its Effect

Congress entrusted responsibility for effectuating the purposes of the Food, Drug and Cosmetic Act to the Secretary of Health, Education, and Welfare; there is one area, however, in which the Secretary is given no discretion: he may not permit residues of cancer-producing substances on foods and in food products.

This principle, the so-called Delaney anticancer principle, was first explicitly included in the Act in 1958 as part of the food additives provision:

Provided, That no additive shall be deemed to be safe if it is found to induce cancer when ingested by man or animal, or if it is found, after tests which are appropriate for the evaluation of the safety of food additives, to induce cancer in man or animal, * * * [Section 409(c)(3)(A), 21 U.S.C. 348(c)(3)(A).]¹¹

The inclusion of that nondiscretionary language was a direct outgrowth of the world-wide concern that had been focused on the cancer problem in 1956 and 1957. The 1956 symposium of the International Union Against Cancer, which included cancer experts from some fifty countries, had reached the conclusion "that repeated exposure to even a minute dose of a cancer-producing agent constitutes a serious health hazard."¹² This finding was corroborated by scientists at the National Cancer Institute.¹³

Enactment of the Delaney anticancer clause followed as a reaction to the unchallenged scientific conclusion that no one knows how to establish safe tolerances for carcinogens. As stated by Secretary Flemming during his testimony on the color additives amendment of 1960:

The clause is grounded on the scientific fact of life that no one, at this time, can tell us how to establish for man a safe tolerance for a cancer-producing agent. Until cancer research makes a

¹¹ Substantially identical language was included in the color additives Section enacted in 1960 (Section 706(b) (5) (B), 21 U.S.C. 376(b) (5)(B), Supplement pp. 14-15. In 1962 the Delaney proviso of both the food and color additives sections was amended to permit the use of an additive as an ingredient of feed if it will neither adversely affect the animal nor will be found in any edible portion of the animal after slaughter nor in any food from the living animal. P.L. 87-781, 76 Stat. 785.

¹² 106 Cong. Rec. 14350, see also *Hearings*, p. 108.

¹³ 106 Cong. Rec. 14350.

breakthrough at this point, there simply is no scientific basis on which judgment or discretion could be exercised in tolerating a small amount of a known carcinogenic color or food additive. So long as the outstanding experts in the National Cancer Institute and the Food and Drug Administration tell us that they do not know how to establish with any assurance at all a safe dose in man's food for a cancer-producing substance, the principle in the anticancer clause is sound. [106 Cong. Rec. 14350.]¹⁴

The statutory reference point was made a finding of carcinogenesis either in humans *or* animals for the obvious reason that protective action should not be withheld until a chemical, although known to be cancer-producing in test animals, is established to have similar potentialities in humans. In fact, the Congress had been advised, in a report submitted to it by the National Cancer Institute, that "[i]f a substance is shown by adequate tests to be carcinogenic for one mammalian species, it is probable that it is carcinogenic for many, but not necessarily for all, other, although quantitative differences between species may be marked."¹⁵

¹⁴This rationale was emphasized repeatedly by Secretary Flemming (*Hearings*, p. 61):

The preponderance of scientific evidence clearly dictates our position: Our advocacy of the anticancer proviso in the proposed color additives amendment is based on the simple fact that no one knows how to set a safe tolerance for substances in human foods when those substances are known to cause cancer when added to the diet of animals. I should like to underline again one statement in particular which I read earlier from the summary of Dr. Mider's review of the role of certain chemical and physical agents in relation to cancer. It is this:

No one at this time can tell how much or how little of a carcinogen would be required to produce cancer in any human being, or how long it would take the cancer to develop.

This is why we have no hesitancy in advocating the inclusion of the anticancer clause.

See also, *Hearings*, pp. 44, 61-62, 74, 87, 94-95, 501 and 507.

¹⁵*Hearings*, p. 53, from the report on "The Role of Certain Chemicals and Physical Agents in the Causation of Cancers" prepared by

Thus, once it is shown that a chemical or additive is a carcinogen in any strain of test animal no element of discretion remains; the Secretary must prohibit its use where there is a possibility that use would result in the presence of residues in food. This is not only the clear import of the statute and of its legislative history,¹⁶ it has been the consistent construction given by the Secretary and by the only reviewing court that has considered the language.¹⁷

Secretary Flemming left no doubt as to how he construed the Delaney anticancer clause:

[The anticancer clause] allows the Department and its scientific people full discretion and judgment in deciding whether a substance has been shown to produce cancer when added to the diet of test animals. But once this decision is made, the limits of judgment have been reached and there is no reliable basis on which discretion could be exercised in determining a safe threshold dose for the established carcinogen.

* * *

And under our basic policy, as well as under the Delaney clause, we have said that where those tests show that a substance will induce cancer when included in the diet of a test animal, that it will be banned. It cannot be used under those conditions. This is our interpretation of the Delaney amendment, and it is our conviction as to sound public policy.

* * *

G. Burroughs Mider, M.D., Associate Director in Charge of Research, National Cancer Institute, National Institutes of Health, Public Health Service, Department of Health, Education and Welfare, quoting from the report of the Subcommittee on Carcinogenesis to the Food Protection Committee, Food and Nutrition Board, National Academy of Sciences - National Research Council.

¹⁶See 106 Cong. Rec. 14358, and Senate Report No. 2422, 85th Cong., 2d Sess., 1958 U.S. Code Cong. & Adm. News 5300, 5309-5310.

¹⁷*Bell v. Goddard*, 366 F.2d 177 (C.A. 6, 1966), discussed *infra*, p. 15.

Now, if these tests show that these substances have induced cancer when ingested by these animals—and, as I said earlier, this question of whether they do or do not show is a matter for scientific determination and the exercise of scientific judgment—but if they show that they have induced cancer when included in the diet of one or both of these animals, then under the law we must ban the use of that particular substance.¹⁸

It was in full recognition of this contemporaneous administrative construction that the Congress reaffirmed its dedication to the Delaney principle by including it in the color additives amendment of 1960.¹⁹

Finally, the Sixth Circuit construed the Delaney clause as “generally intended to prohibit the use of any additive which under any conditions induce cancer in any strain of test animal.” *Bell v. Goddard*, 366 F.2d 177, 181 (1966). In response to the argument that the per capita consumption of the chemical under attack—diethylstilbestrol, an estrogen additive used to produce juicier and fatter caponettes—was insignificant and that we are naturally exposed to estrogens, the Court said (366 F.2d at 182):

[t]he answer to the petitioner’s contentions in great part is that DES is a carcinogen. The record shows that DES is definitely a cause of cancer in animals, at least an inciter of incipient cancer in man, and possibly a cause of cancer in man. The record also shows that it may take many years, as much as the greater part of a lifespan, for a carcinogen to pro-

¹⁸*Hearings*, pp. 501, 514 and 517.

¹⁹Section 706(b) (5) (B), 21 U.S.C. 376(b) (5) (B).

Most recently the Mrak Commission, recognizing that “[t]he effect of the Delaney clause is to require removal from interstate commerce of any food which contains analytically detectable amounts of a food additive shown to be capable of inducing cancer in experimental animals,” recommended modification of the language to permit the Secretary some area of discretion (App. B-4).

duce a detectable cancer, and that the quantity of DES which is required to cause a cancer is presently unknown. All that is positively known is that there is a definite connection between DES and cancer. Furthermore, it was shown that prolonged exposure to even small amounts of carcinogenic substances is more dangerous than short term exposure to the same or even larger quantities.

2. The Anticancer Principle is Fully Applicable to Pesticide-Chemicals

As we have shown, the Delaney anticancer principle requires the Secretary to take whatever action is necessary to preclude the addition to food products of additives that are found to induce cancer when ingested by man or animal. We now show that that principle is fully applicable to pesticide-chemicals.

As is true of the Act generally, protection of the public health was an overriding objective sought to be realized by Congress when it enacted the pesticide provision. As stated in both the House and Senate Reports and by the floor leader in the House:

A primary objective in drafting the bill was to develop legislation that would provide for prompt administrative action to permit effective use of pesticide chemicals without hazard to the public health; legislation that would be safe for consumers and practical for producers.²⁰

Hence, in exercising his authority under the provision the Secretary is to consider "the overall effect the pesticide chemical may have in consumers' diets."²¹ The Congress emphasized that:

²⁰House Report No. 1385, 83rd Cong., 2d Sess., p. 2; Senate Report No. 1635, 83rd Cong., 2d Sess., 1954 U.S. Code Cong. & Admin. News, p. 2627; 100 Cong. Rec. 9726.

²¹House Report No. 1385, *supra*, fn. 20, p. 3; Senate Report No. 1635, *supra*, fn. 20, p. 2628. See also House Report No. 1385, p. 8 and Senate Report No. 1635, p. 2632.

Before any pesticide-chemical residue may remain in or on a raw agricultural commodity, scientific data must be presented to show that the pesticide-chemical residue is safe from the standpoint of the food consumer. The burden is on the person proposing the tolerance or exemption to establish the safety of such pesticide-chemical residue.²²

Finally, the Congress made it clear that the tolerances were to be established by focusing on the particular pesticide-chemical “rather than with reference to the formulated or finished product itself. For example, in a finished product containing DDT a tolerance under this bill would be established for DDT rather than for the finished product itself.”²³

- a. The Secretary, by contemporaneous administrative construction, has construed the Delaney principle as being fully applicable to the pesticide provision

It has long been recognized that “[a]dministrative practice, consistent and generally unchallenged, will not be overturned except for very cogent reasons [and that this] practice has peculiar weight when it involves a contemporaneous construction of a statute by the men charged with the responsibility of setting its machinery in motion * * *”. *Norwegian Nitrogen Co. v. United States*, 288 U.S. 294, 315. As we show, the person “charged with the responsibility of setting” in motion the machinery of the Food, Drug and Cosmetic Act not only construed the Delaney principle as applying fully to the pesticide provision, he so told the Congress. Indeed, the Congress was advised that even if an anticancer policy had not been stated, the Secretary would nevertheless read the Act as if it were included. The Congress, apprised of this contemporaneous administrative construction, tacitly endorsed it.

²²House Report No. 1385, *supra*, fn. 20, p. 5; Senate Report No. 1635, *supra*, fn. 20, p. 2629.

²³House Report No. 1385, *supra*, fn. 20, p. 7; Senate Report No. 1635, *supra*, fn. 20, p. 2631.

The anticancer principle was first inserted in the Food Additives amendment enacted on September 6, 1958. By November 9, 1959, the Secretary already had construed its requirements as applying to pesticide-chemicals and, indeed, had relied upon it in ordering the destruction of raw agricultural commodities that contained residues of a pesticide-chemical which had been found to be capable of inducing cancer in test animals. The pesticide-chemical was aminotriazole, the raw agricultural commodities were cranberries. In stopping the sale of cranberries that were found to have residues of aminotriazole "which causes cancer in the thyroid of rats when it is contained in their diet," Secretary Flemming stated:

Because of the implications of this incident in its relation to the safety of our food supply, I am prompted to make the following additional comment.

As the cranberry episode illustrates, the Food and Drug Administration has declined to set any tolerance for any amount of a chemical in foods if the chemical produces cancer when fed to test animals. This principle is set down in the Food Additives Amendment, enacted last year, in a specific provision prohibiting the Food and Drug Administration from setting any tolerance for any such chemical. Even though the earlier Pesticide Amendment, which is applicable to the cranberries, does not contain such a specific prohibition, the same principle has been applied.

The application of this principle is necessary in our opinion because while in theory there may be a minute quantity of a carcinogen which is safe in foods, in actuality our scientists do not know whether this is true or how to establish a safe tolerance.

Therefore, we would oppose any attempt to take the cancer clause out of the Food Additives Amendment, and we will support the inclusion of such a

clause in the color bill which is now before the Congress.²⁴

Five days later, in issuing his third directive that contaminated cranberries be seized, Secretary Flemming said:

Seizure action is being initiated on the basis that the berries were shipped illegally in interstate commerce since no tolerance for aminotriazole in foods has been established. Refusal by the Food and Drug Administration to set a tolerance for this chemical is in accordance with the Department's policy not to permit the use of chemicals in food when it is established that they cause cancer in animals or in man, a policy incorporated by Congress in the Food Additive Amendment to the Food, Drug and Cosmetic Act.²⁵

On November 16, 1959, the Secretary expanded on the rationale underlying his actions:

Refusal on the part of the Food and Drug Administration to permit the inclusion of any quantities of aminotriazole in food is based on the Department's policy of refusing to permit the use of chemicals in food when it is established that they cause cancer in animals or man. Research has established the fact that the weed killer, aminotriazole, causes cancer in the thyroid of rats when it is contained in their diet. The basic laws under which the Food and Drug Administration operate provide authority for the institution of such a policy.

This policy, however, was actually looked at and considered by the Congress when in 1958 it included specific language in the Food Additive Amendment to the Food, Drug and Cosmetic Act.

The provision states that "no additive shall be deemed safe if it is found to induce cancer when ingested by man or animal, or if it is found, after tests

²⁴ HEW, News Release, November 9, 1959.

²⁵ HEW, News Release, November 14, 1959.

which are appropriate for the evaluation of the safety of food additives, to induce cancer in man or animal.”

In such circumstances, the Food and Drug Administration is prohibited from issuing regulations setting tolerances for the additive, and shipment of foods containing any amount of such additive in interstate commerce is therefore illegal.²⁶

And on November 18, 1959, the Secretary not only reaffirmed that it was Departmental policy to apply the requirements of the Delaney anticancer principle to pesticide-chemicals, he also noted that he had so advised the Congress:

I have called this conference for the purpose of considering a plan to be submitted by representatives of the cranberry industry designed to separate contaminated cranberries from those that are not contaminated.

The shipment in interstate commerce of cranberries containing residues of aminotriazole is in violation of the Food, Drug, and Cosmetic Act.

Refusal on the part of the Food and Drug Administration to permit the inclusion of any quantities of aminotriazole in food is based on the Department's policy of prohibiting as unsafe the use of chemicals in food when it is established that they cause cancer in animals or man. Research has established the fact that the weed killer, aminotriazole, causes cancer in the thyroid of rats when it is contained in their diet.

It is the Department's position that because such a chemical is unsafe, we cannot issue a regulation setting a tolerance for it when it causes cancer in man or animal. Shipment of foods containing any amount of such a chemical in interstate commerce is therefore illegal.

This policy is basic in our food and drug law, and it was spelled out in the law itself when Congress re-

²⁶HEW, News Release, November 16, 1959.

cently passed the Food Additives Amendment. This included the following provision:

[Delaney Amendment set out]

In endorsing this language, we told Congress this policy was already in force under the pesticide chemicals law without the above-quoted language.²⁷

This statutory construction was discussed in detail by the Secretary when he testified on the 1960 color additives amendment,²⁸ with the following colloquy taking place:

The CHAIRMAN. Mr. Younger.

Mr. YOUNGER. Yes, Mr. Chairman. Mr. Secretary, as regards the question of applying the test to any of the substances used in insecticides, or additives, have all of them been tested as to cancer?

Secretary FLEMMING. Mr. Congressman, and Mr. Chairman, taking the pesticides side of the amendment first, if I may do so—

Mr. YOUNGER. Yes.

Secretary FLEMMING. About 110 pesticides have been cleared, authorized, or certified as safe by the Food and Drug Administration. That means, of course, that that authorization includes the question of whether or not they are carcinogenic, or whether or not they do induce cancer.²⁹

Furthermore, in a subsequent letter to Chairman Oren Harris of the House Committee on Interstate and Foreign Commerce, the Secretary again emphasized that

According to advice of our scientists, the principle of the above-quoted anticancer (Delaney) proviso of the Food Additives Amendment reflects, basically, the current state of scientific knowledge, and we would therefore, except as noted below, feel con-

²⁷Statement of Arthur S. Flemming, November 18, 1959.

²⁸*Hearings*, pp. 63-69, 89-90.

²⁹*Hearings*, p. 75.

strained to apply the same principle even in the absence of this proviso, and we do in fact apply it in the administration of the Pesticide Chemicals Amendment which does not contain the proviso.³⁰

It is also of significance that in the regulations promulgated in implementation of the pesticide provision, only four specific reasons are detailed as examples of when it may be appropriate to establish a zero tolerance for the residues of a chemical. Among the reasons singled out for such emphasis is where (21 CFR 120.5):

(b) The chemical is carcinogenic to or has other alarming physiological effects upon one or more of the species of the test animals used, when fed in the diet of such animals.

Moreover, the Secretary has emphasized that he would feel compelled to apply the anticancer principle even if it had not been expressly included in the Act. Senator Dirksen summarized the Secretary's position as follows (106 Cong. Rec. 15381):

Mr. President, this matter has been of considerable interest to me. I have discussed it with the Secretary of Health, Education, and Welfare. He says that even if the Delaney amendment were deleted from the legislation, they would still have to apply that general principle, and that they do apply it on the advice of the National Institutes of Health.³¹

³⁰House Report No. 1761, 86th Cong., 2d Sess., 1960 U.S. Code Cong. & Adm. News, p. 2936.

It is interesting to note that the Department of Agriculture concurred in the conclusion that the requirements of the Delaney anti-cancer principle should be read into the pesticide provision. See *Hearings*, pp. 379 and 384-385.

³¹Similar characterizations of the Secretary's position were offered in the House by Chairman Harris (106 Cong. Rec. 14359 and 14362):

The Secretary further stated that even if the Delaney clause is deleted from the bill, he believes that he has the authority to apply the policy that is reflected in that clause but he urged the Congress to join with the executive branch

The Secretary reached this conclusion in view of the overriding consumer protection objective of the Act and the inability to fix safe levels of carcinogens:

As long as the preponderance of scientific evidence is in that particular direction, then I say that the policy incorporated in the Delaney amendment is a sound policy and one that we should follow.

Whenever we establish the fact that a substance induces cancer when included in the diet of an animal, we are going to bar its use as far as it being included in the diet of man is concerned; that is, we are going to do everything we can under our existing law to achieve that objective.³²

* * *

I want to emphasize the statement I made on January 26 that the Food, Drug and Cosmetic Act, as it now stands, will be enforced to prohibit the addition of cancer-producing substances to food unless a law should be passed directing us to follow another course of action.

in giving added assurance to the public by including the anti-cancer clause in the proposed color additives legislation.

* * *

It is true that the Secretary of Health, Education, and Welfare did say if we did not have the Delaney clause in the bill - and I here want to join others in complimenting the gentlemen from New York [Mr. Delaney] for his consistent and determined effort toward this great problem - he would administer the law the same as if the Delaney clause had been written into it. The Secretary did have this provision in the bill when he sent it up to the Congress and asked me to introduce it. The Secretary testified he thought it should remain in the bill because he did not believe that he as Secretary or any administrator at this time should have the authority to make a determination permitting the use of any substance known to be cancer producing.

See also 106 Cong. Rec. 14358 and House Report 1761, 86th Cong., 2d Sess., 1960 U.S. Code Cong. & Adm. News, pp. 2932-2933.

³²*Hearings*, pp. 95-96.

Even though we have this authority in the law, we urge the Congress to join with the executive branch to give added assurance to the consuming public by directing the anticancer clause in the proposed color-additives amendment.³³

* * *

As I indicated in my testimony, with or without a Delaney amendment on the food additives, with or without a Delaney amendment on the color additives, this is the policy that we would follow under the basic authority that has been conferred on us by Congress.

We know of no other way of discharging that authority in a manner that would be fair to the consumer.³⁴

* * *

- b. Congress intended for the Delaney principle to apply to the Food, Drug and Cosmetic Act generally, including the pesticide provision

As we have shown, Congress was well apprised of the fact that the Secretary was applying the Delaney anticancer principle to the pesticide provision and tacitly approved of that construction of the Act when it passed the color additives amendment. We now show that Congress itself considered the explicit statement of the Delaney principle unnecessary, rejected efforts to weaken the Act's built-in anticancer bias, and intended for the pesticide and food and color additives sections to be similarly construed.

Perhaps the most striking aspect of the legislative history of the first Delaney amendment is that the Committees of both the House and the Senate with responsibility for the Act, thought the amendment unnecessary; that is, considered it implicit in the general language of the Act. Congressman Oren Harris, Chairman of the Committee on Interstate and

³³Hearings, p. 501.

³⁴Hearings, p. 506. See also, *Hearings*, pp. 61-63, 74, 508, 513, 524-526.

Foreign Commerce, explained the Committee's action as follows (104 Cong. Rec. 17414, emphasis added):

Subsequently to the reporting of the bill, as amended in the full committee, the committee adopted unanimously a further amendment to the amendment. This amendment was suggested by Mr. DELANEY who over the years since he was the chairman of a Select Committee to Investigate the Use of Chemicals in Food and Cosmetics, has expressed his deep and abiding interest in this subject. *While the Committee felt that the bill as reported by the committee includes the matter covered by the Delaney amendment in the general language contained in the bill, there was no objection to the addition of the amendment suggested by Mr. DELANEY.* This amendment would be inserted on page 24, line 16 of the bill H.R. 13254, as reported; * * *

The report of the Senate Committee on Labor and Public Welfare is even more emphatic on this point (emphasis added):

Two amendments made by your committee to the bill as passed by the House are explained below. We would like, in addition, to call attention to the fact that the Committee on Interstate and Foreign Commerce of the House of Representatives, before bringing the bill to a vote in the House, decided to add to its previously approved bill the provision which appears on page 8 of the House-passed bill (lines 10 to 15) and reads as follows:

[Delaney anticancer clause set out]

Your committee, which has the responsibility in the Senate of considering all legislation primarily relating to the health of our people, is well aware and thoroughly approving of the vast amount of time and energy which Congressman Delaney, author of that amendment, has devoted to the fight against cancer and to our attempts to find its cause and cure. *We have no objections to that amendment whatsoever, but we would point out that in our opinion it is the intent and purpose of this bill, even without that*

*amendment, to assure our people that nothing shall be added to the foods they eat which can reasonably be expected to produce any type of illness in humans or animals. We applaud Congressman Delaney for having taken this, as he has every other opportunity, to focus our attention on the cancer-producing potentialities of various substances, but we want the record to show that in our opinion the bill is aimed at preventing the addition to the foods our people eat of any substances the ingestion of which reasonable people would expect to produce not just cancer but any disease or disability. In short, we believe the bill reads and means the same with or without the inclusion of the clause referred to. This is also the view of the Food and Drug Administrator.*³⁵

Thereafter in 1960 Congress turned aside efforts to temper the impact of the anticancer principle; specifically, to make carcinogenicity just another factor to be considered by the Secretary. Chairman Harris explained why the House Committee rejected these efforts (106 Cong. Rec. 14359):

The [National Academy of Sciences] panel discussed in considerable detail the scientific problems that confront us in connection with determination of the cancer-producing potentials of chemicals. They pointed out the difficulties of designing and conducting an experiment to determine whether a substance is a cancer producer for man and the difficulties in evaluating the test data after they are obtained.

Some of the panel members have suggested that despite these difficulties, in extraordinary cases, the Secretary of Health, Education, and Welfare should have the authority to decide that a minute amount of a cancer-producing chemical may be added to man's food after a group of scientists consider all the facts and conclude that the quantity to be tolerated is probably without hazard.

* * *

³⁵Senate Report No. 2422, 85th Cong., 2d Sess., 1958 U.S. Code Cong. & Adm. News, pp. 5309-5310.

In view of the uncertainty surrounding the determination of safe tolerances for carcinogens, the committee decided that the Delaney anticancer provision in the reported bill should be retained without change.

Finally, even had Congress not emphasized the pervasive nature of the anticancer prohibition, it intended for the pesticide, and food and color additives provisions to be similarly construed. Each of those provisions have the same fundamental purpose: safeguarding the public health by protecting the consumer.³⁶ Further, each was an outgrowth of the investigation and findings of the Select Committee to Investigate the Use of Chemicals in Food Products.³⁷ It was the apparent intent of the Select Committee to initiate substantially parallel legislation covering each of those areas.³⁸ The absence of the anticancer clause in the pesticide provision is explained by the fact that it had been enacted two years before disclosure of the cancer findings which prompted the Delaney amendment. (See *supra*, p. 12). And there was no reason for Congress to amend the pesticide provision: first, Congress did not consider the anticancer clause necessary (see *supra*, pp. 25-26) and second, it was fully apprised of the Secretary's determination—as a matter of law—to apply the anticancer principle no less rigorously to pesticide-chemicals (see *supra*, p. 17).³⁹

³⁶*Pesticides*: House Report No. 1385, *supra*, fn. 20, pp. 2, 3, 5 and 7; Senate Report No. 1635, *supra*, fn. 20, pp. 2627-2629 and 2632; 100 Cong. Rec. 9726. *Food Additives*: House Report No. 2284, 85th Cong., 2d Sess., pp. 1, 4 and 5; Senate Report No. 2422, *supra*, fn. 16, p. 5301; 104 Cong. Rec. at 17413, 17416, 17418-17420. *Color Additives*: 106 Cong. Rec. at 14350 and 14358.

³⁷*Pesticides*: House Report No. 1385, *supra*, fn. 20, p. 4; Senate Report No. 1635, *supra*, fn. 20, p. 2628; *Food Additives*: House Report No. 2284, *supra*, fn. 36, p. 2; *Color Additives*: 106 Cong. Rec. 14358; *Hearings*, p. 107.

³⁸House Report No. 2356, 82nd Cong., 2d Sess., pp. 26 and 27. See, also, *United States v. Bodine Produce Co.*, 206 F. Supp. 201, 206-207 (Ariz., 1962).

³⁹It is not without interest that industry groups did not object either to the explicit inclusion of the anticancer clause in the color

In *Flemming v. Florida Citrus Exchange*, 358 U.S. 153, a unanimous court upheld the Secretary's decision to decertify a coal-tar color, which had been certified for almost fifteen years, because evidence before him indicated that the color, when included in the diets of rats in small dosages "was deleterious and often fatal, with liver damage and enlargement of the heart in evidence." 358 U.S. at 159. It is significant that the color additives provision had not yet been amended to include, explicitly, the anticancer principle. Yet the court agreed that it was appropriate for the Secretary to base his potential harm to humans finding on the results obtained from the testing of laboratory animals. See, also: *Certified Color Industry Committee, et al. v. Secretary*, 283 F.2d 622 (CA 2, 1960), where the court extended *Florida Citrus* to permit the Secretary to apply his revocation order to color batches previously certified.⁴⁰

additives provision or its implicit reading by the Secretary into the pesticide provision. *Hearings*, pp. 172, 182 and 183.

⁴⁰That each of these provisions is to be similarly construed is also evident from the comments of Assistant Secretary of Commerce Elliot L. Richardson, on the inclusion of the first proposed anticancer clause (104 Cong. Rec. 17415):

The widespread interest in cancer led to suggestion that the food additives legislation should mention the disease by name and forbid the approval of any substance that is found upon test to cause cancer in test animals. This Department is in complete accord with the intent of these suggestions - that no substance should be sanctioned for uses in food that might produce cancer in man. H.R. 13254, as approved by your committee, will accomplish this intent, since it specifically instructs the Secretary not to issue a regulation, permitting use of an additive in food if a fair evaluation of the data before the Secretary fails to establish that the proposed use of the additive will be safe. The scientific tests that are adequate to establish the safety of an additive will give information about the tendency of an additive to produce cancer when it is present in food. Any indication that the additive may thus be carcinogenic would, under the terms of the bill, restrain the Secretary from approving the proposed use of the additive unless and until further testing shows to the point of reasonable certainty that the additive would not produce cancer and thus would be safe under the proposed conditions

B. The Record Establishes that DDT is a Carcinogen

As we have shown the Delaney anticancer principle pervades the entire Food, Drug and Cosmetic Act and applies with full force to its pesticide provision. That being the case it is incumbent upon the Secretary to establish, without delay, zero tolerances for the residues of any pesticide-chemical which is found capable of inducing cancer in man or in "any strain of test animal." *Bell v. Goddard, supra* at p. 181.

We now show that in light of the overwhelming and uncontroverted evidence of record which establishes the carcinogenicity of DDT, it is incumbent upon the Secretary to take immediate action directed at securing the complete absence of DDT residues on raw agricultural commodities.

1. *The Evidence Presented to the Secretary by Petitioners Establishes that DDT is a Carcinogen*

In support of their contention that DDT is a carcinogen petitioners submitted three scientific studies. The most comprehensive was that recently completed by thirteen scientists working under the sponsorship of the National Cancer Institute, National Institutes of Health, Department of Health, Education, and Welfare—the so-called *Innes* report (App. A-14).⁴¹ DDT was added to the diet of mice and compared with both positive and negative control groups (App. A-15). The frequency of tumors of the liver, lungs and lymphoid organs was four times greater in mice fed DDT than those in the negative control group (App. A-24). The carcinogenicity was clearly established because DDT caused cancer of the same kind and at approximately the same frequency as did

of use. This would afford good, strong public health protection.

⁴¹ *Bioassay of Pesticides and Industrial Chemicals for Tumorigenicity in Mice: A Preliminary Note*, J. R. M. Innes, et al., 42 Journal of the National Cancer Institute 1101 (June, 1969).

known cancer-causing agents, the positive controls (App. A-24, 26).

The National Cancer Institute study confirmed earlier evidence indicating the carcinogenicity of DDT. One study also submitted in support of the petition, a five generation study of mice, is particularly probative for it found carcinogenicity to result from prolonged exposure to low levels of DDT.⁴² The mice were fed a dosage of DDT at a level which resulted in its accumulation in the fatty tissue of the experimental group in "the same order as the DDT level in the fatty tissue of the urban population" (App. A-29). It was found that the mice which had been subjected to the accumulation of low levels of DDT developed a substantially higher incidence of leukemia and of tumors than did the non-DDT mice (App. A-29).

Finally, petitioners submitted a study which is at least probative evidence that DDT may have carcinogenic effects in man.⁴³ In studies undertaken at the University of Miami School of Medicine, human victims of terminal cancer were found to contain more than twice the concentration of DDT residues in their fat as did victims of accidental death (App. A-34, 35). The accident victims were found to carry 9.7 parts per million in their fat, about average for Americans, while the cancer victims contained 20 to 25 parts per million (App. A-34-36).

2. *The Report of the Mrak Commission Corroborates Conclusively the Finding that DDT is a Carcinogen*

In rejecting the petition the Secretary acknowledged that he had relied in part on the findings of the Mrak Commission.

⁴²*Investigations on the Effects of Chronically Administered Small Amounts of DDT in Mice*, Kemeny and Tarian, 22 *Experientia* 748 (1966) (App. A-28).

⁴³*Pesticide Concentrations in the Liver, Brain and Adipose Tissue of Terminal Hospital Patients*, J. L. Radomski, W. B. Deichmann, E. E. Clizer, 6 *Food Cosmetics and Toxicology* 209 (1948) (App. A-30).

However the findings of that Commission, rather than in any way detracting from the effect of the scientific evidence submitted by petitioners, supports fully the conclusion that DDT is a carcinogen.⁴⁴

At the outset it should be noted that the Commission acknowledged the credibility of the *Innes* study (App. B-41), agreeing both with the propriety of using test "doses considerably higher than would be present in food" (App. B-37) and with the conclusion of the *Innes* group that evidence of increased tumorigenicity must be accepted as an index of potential carcinogenicity (App. B-36) since "(a) No adequately tested chemical has been found to produce only benign neoplasms and, (b) a substantial percentage of benign-appearing tumors in mice has been demonstrated ultimately to eventuate in cancer" (App. B-47).

The panel itself categorized pesticide-chemicals according to their probable carcinogenesis (App. B-38). Of critical significance is the fact that DDT was included among the "compounds judged 'positive' for tumor induction on the basis of tests conducted adequately in one or more species, the results being significant at the 0.01 level" (App. B-40). Indeed, the panel acknowledged that "the observations of human experience have not been sufficient to eliminate the possibility that continued chronic exposure [to DDT] may slowly induce a low level of cancer in man" (App. B-41).

The Commission's Technical Panel on Carcinogenesis was particularly concerned about reducing residues in food because it found that (App. B34):

The presence of carcinogenic substances (of both synthetic and natural origin) in food might be a significant factor in the occurrence of what is

⁴⁴Indeed, the Commission stated that "the evidence for the carcinogenicity of DDT in experimental animals is impressive and the Panel takes no exception to the conclusions as to DDT recorded in the JNCI report of the National Cancer Institute study." (App. B-41).

commonly referred to as "spontaneous" cancer in man and animals. * * *⁴⁵

C. The Secretary Has Utterly Failed to Comply With the Act

It remains only to apply the principle of the Delaney clause to the evidence of the carcinogenicity of DDT. We submit that there is no way in which the anticancer principle can be applied, short of its complete obliteration, without reaching the conclusion that the Secretary is under a statutory mandate to take whatever action is necessary to achieve the elimination of DDT residues from raw agricultural commodities.

But what has the Secretary done; he has responded with grandiose assurances that he will, sometime in the future, consult with the Secretaries of Agriculture and Interior "on the environmental contamination aspects of pesticide registrations" and he has "agreed that HEW should review established tolerance levels of specific pesticides in food and drinking water." This is the sum and substance of the Secretary's response; assurances of concern coupled with the postponement of action. These, declared the Secretary in his rejection of petitioners' request for immediate action, "are the most reasonable steps that [he] should be tak[ing] at this time" (App. A-98).

What the Secretary ignores, however, is that the Delaney anticancer principle permits no equivocation; it does not ask for assurances and promises but rather for action and immediate action at that. This is where the Secretary has completely failed to discharge his responsibility. Stripped of rhetoric he has done nothing to protect the public from the continued ingestion of the carcinogen DDT. To be sure it is the Secretary of Agriculture that has the authority to suspend and cancel the registration of pesticides. But the Secretary of Health, Education, and Welfare cannot hide

⁴⁵Earlier in the Report it is stated that since human exposure to pesticides is greatest through foods; "so far as the health of the general population is concerned, the greatest emphasis on pesticide control should be on reducing the concentrations in food" (App. B-7).

behind that dichotomy of authority; he has his own responsibilities and they require taking all actions necessary to effect the immediate cessation of the use of DDT.

The Secretary's preoccupation with possible adverse economic effects on industry is misplaced. The clear import of the Delaney amendment is that when the conflict is between possible economic disruption and the ingestion of a carcinogen, protection of the public health, and not the enhancement of private gain, is always to win out. Certainly this is made clear in *Flemming v. Florida Citrus Exchange*, 358 U.S. 153, where the Supreme Court rejected the contention that the Secretary was to establish a tolerance for a color (which was found not to be harmless) because its use was an economic necessity. It is noteworthy that unlike DDT the additive there at issue is not a carcinogen.

It is particularly imperative that the Secretary move with all possible expedition in the case of DDT. First, the studies of *Radomski, et al.* submitted by petitioners (App. A-30) are at least circumstantial evidence that DDT may be carcinogenic not only in test animals but in man as well; the Mrak Commission itself raised a serious question along these lines (App. B-41). Second, the chemical stability of DDT, with a probable "half-life" of 10 to 15 years, makes it imperative that its usage be prohibited immediately. Lastly, each member of the public, once having been warned of the potential dangers of most food additives can voluntarily stop their further ingestion. In the case of DDT no element of choice exists. Like it or not each of us is forced to ingest DDT regularly included as an additive to the food we eat.

Even if it were permissible for the Secretary to defer immediate action directed at the withdrawal of a pesticide carcinogen the continued use of which is necessary for public health and food production purposes, deferral of action in the case of DDT could not be justified. The Mrak Commission found that (App. B-5):

It is reported by well informed scientists that as far as insect vectors of disease are concerned there are none known which are normally susceptible to DDT that cannot be controlled with a substitute.

* * * Although DDT is still involved in some of the international food production programs sponsored by U.S. agencies, there is a feeling that a withdrawal or systematic reduction of DDT would have a minimum effect.⁴⁶

II

PETITIONERS PRESENTED "REASONABLE GROUNDS" IN SUPPORT OF THEIR PETITION; ACCORDINGLY, IT WAS INCUMBENT UPON THE SECRETARY TO AT LEAST PUBLISH THEIR PROPOSAL IN THE *FEDERAL REGISTER* THEREBY INITIATING THE ADMINISTRATIVE PROCEDURES

In response to the petition, W. B. Rankin, Deputy Commissioner, Food and Drug Administration, advised petitioners that it was "being processed as provided by 21 CFR 120.32" (App. A-86). That regulation provides that "an interested person furnishing reasonable grounds therefor, may propose * * * repealing a tolerance for a pesticide chemical on raw agricultural commodities * * *." It defines "reasonable grounds" as including "an explanation showing wherein the person has a substantial interest in such tolerance * * * and an assertion of facts (supported by data if available) showing * * * that new data are available as to toxicity of the chemical * * *." Subsequently, Herbert L. Ley, Jr., M.D., Commissioner of Food and Drugs, by letter of December 8, 1969, advised petitioners of the Department's determination that "a proposal based on [their] petition is not being published" (App. A-98). After referring to the persistence of DDT, Commissioner Ley found that "in the absence of a showing that establishing the zero tolerances you request would be practical, we find that you have not presented reasonable grounds to support the proposed action" (App. A-98).

⁴⁶See also App. B-6, 25. This is because of the fact that there are many alternatives to DDT (App. B-5, 7), alternatives "that do not have the damaging side effects on the environment that DDT exhibits" (App. B-6).

The effect of this determination was to deprive petitioners not only to the benefits of *Federal Register* publication, but to deny to them the entire administrative machinery provided for in the Food, Drug and Cosmetic Act. While it is conceded that the fact that there is widespread environmental contamination complicates the problem for the Secretary, it is ludicrous to thereby suggest that the Secretary need do little more than bemoan the magnitude of the problem. Instead, what is called for is full utilization of the administrative processes for the collection and distillation of all possible solutions.

The procedures provided for in 21 CFR 120.32 have a dual purpose. First, to assist the Secretary in the discharge of his statutory responsibilities by invoking a dialogue as to the dangers of a particular pesticide and second, to assist the Secretary by focusing on the solutions which are available to him to meet a recognized danger. In the case of DDT the dangers are uncontroverted; it is the solution which is at issue. The Secretary, by his own concession, does not himself know how to solve the DDT problem. The purpose of 21 CFR 120.32 is to permit the public generally to lend its assistance with the hope of broadening the Secretary's awareness as to what can be done.

Petitioners recognized the difficulty of the problem which confronts the Secretary (a problem which under the Delaney principle he cannot lawfully ignore) and in their supplemental filing of October 31, 1969 suggested a possible solution which would give effect to the anticancer mandate while not threatening confiscation of a major portion of our food supply—the immediate establishment of zero tolerances with exemption from seizure of any commodities that contain DDT residues that are a consequence of applications made prior to the effective date of the revised tolerances.

We do not suggest that this is the only procedure for effecting the required zero tolerance. We do contend that it is not a frivolous suggestion and that it should have suggested to the Secretary that had the proposal been

published in the *Federal Register* other solutions would have been forthcoming.⁴⁷ The real objective of public notice is, after all, to marshal information for the benefit of administrative agencies that may unfortunately be less than omniscient but nevertheless have to make judgments which can have a profound effect on our well-being. It is clear therefore, that petitioners⁴⁸ and the public generally were substantially prejudiced by the Secretary's refusal to notice the proposal.

There was no basis upon which the Secretary properly could conclude that petitioners had not presented "reasonable grounds" sufficient, at least, to initiate the administrative process.⁴⁹

We have already shown that DDT is a carcinogen. We now show that wholly apart from its carcinogenic potentials DDT represents an imminent hazard to human health, if indeed, not to survival itself.⁵⁰

Man is an integral part of the living system which includes about 200,000 species in the United States. *Most of these are considered to be essential to the well-being of man.* Pesticides are now affecting individuals, populations, and communities of natural organisms. Some, especially the persistent insecticidal chemicals such as DDT, have reduced the reproduction and survival of nontarget species. (App. B-8, emphasis added).

⁴⁷The Mrak Commission itself offered an alternative proposal, the "stepwise lowering" of tolerances (App. B-4).

⁴⁸It should be noted that no suggestion was made in Dr. Ley's letter that the petitioners were not "interested persons" or that they otherwise lacked standing to prosecute their petition.

⁴⁹The Secretary's denial seems premised on a failure to establish reasonable grounds in support of the particular solution offered by petitioners; the regulation does not permit so restrictive a reading.

⁵⁰A showing of carcinogenicity is, of course, not necessary to initiate a repeal proceeding.

That conclusion of the Mrak Commission is corroborated in frightening detail throughout its voluminous report. DDT residues are established nerve toxins and have acute effects on the central nervous system (App. B-21, 22, 25).⁵¹ In addition, DDT residues are responsible for the induction of metabolizing enzymes in the liver, including in the liver of man (App. B-20, 24, 29),⁵² thus "alter[ing] the susceptibility to drugs or other chemicals that are normally metabolized by these enzymes" (App. B-61), and generally causing liver damage (App. B-21, 22, 26, 28). And DDT concentrations in fat (it is accumulated in fatty tissue) may itself "constitute a health hazard". (App. B-27).⁵³

⁵¹ The Commission specifically found that:

The chlorinated hydrocarbon insecticides, especially DDT, have been known to act in the cerebellum, brainstem, spinal cord, and peripheral nerves * * * Thus the acute effects of these compounds appear to be scattered widely throughout the nervous system. Moreover, they have topical action on the nerve endings in the mucous membrane (Hayes, 1963) and may extend their action proximally on the nerve pathways as shown by various case reports, * * * (App. B-28).

* * * * *

In animals, the earliest apparent effect of DDT poisoning is abnormal susceptibility to fear, with violent reaction to stimuli that normally would be unnoticed (Hayes, 1965). There is definite motor unrest and an increased frequency of spontaneous movements. A fine tremor appears and becomes constant, interfering with normal activity. As the nervous system involvement progresses, there are attacks of epileptiform tonic-clonic convulsions. Death may result from ventricular fibrillation. (App. B-29)

⁵² As stated by the Mrak Commission, "it is a sad comment on the dearth of knowledge of human physiology to point out that the threshold dose of DDT for induction of metabolizing enzymes in human liver is unknown." (App. B-20).

⁵³ The Mrak Commission goes on to acknowledge that "rapid mobilization of fat in nutritional deprivation may result in sufficiently high residual DDT levels to produce conventional toxicity * * * Such toxicity has actually been demonstrated for DDT in rats in laboratory experiments" (App. B-27).

Apart from these direct human health hazards from the exposure to DDT residues, such residues have a profound effect on the biosphere upon which man is dependent. For example, DDT and its residues interfere with the photosynthetic process (App. B-6, 15). The relationships between DDT residues and hazards to bird populations, by both direct mortality and reproductive failure, have been particularly well documented. (App. B-16). DDT causes carnivorous birds, including birds of prey,⁵⁴ sea birds, and many other species, to lay eggs with abnormally thin shells. These eggs break prematurely resulting in sharply reduced reproductive success. Populations of these species have in many cases undergone catastrophic declines, in some cases approaching extinction. The decline in eggshell thickness occurred in the late 1940's, shortly after the large scale introduction of DDT into the world environment. Controlled feeding experiments with DDT and its metabolites have established the casual relationship between DDT residues, the production of eggs with abnormally thin shells, and greatly reduced reproductive success (App. B-17).

DDT inhibits reproduction in fish, with abnormal mortality of the fry following the contamination of the adult fish and their eggs. This has occurred in several freshwater situations, with mortalities of 100 percent of the fry in some instances (App. B-16). Controlled experiments confirmed that DDT residues were the causative agents (*ibid.*). Many fish from other areas, including commercially important fish from marine waters, show concentrations of DDT residues in their tissues that approach those that caused this abnormal fry mortality. Important freshwater and marine fisheries are

⁵⁴This is a consequence of biological magnification which results in the concentration of DDT residues as you move up a food chain. ("Chemicals which are preferentially absorbed into living organisms and stored for extended period, as are DDT and its derivatives, may, therefore, be concentrated greatly up the food chain" (App. B-12)). This is particularly of concern to man who is of course, at the top of a food chain.

seriously threatened by present and anticipated future concentrations of DDT residues in the tissues of the fish.⁵⁵

DDT residues do great damage to useful invertebrates of many species. Insect communities are frequently disrupted by the killing of beneficial predatory and parasitic insects, thereby aggravating the insect pest problem DDT was intended to control. DDT kills pollinating insects. It damages various crustaceans such as crabs and shrimp (App. B-16). Even the base of oceanic food chains, the phytoplankton, can have their photosynthetic activity reduced by a few parts per billion of DDT in the water (App. B-6, 15).

The indirect cost to society of this degradation reaches the incalculable (App. B-18). It is not at all surprising that the Mrak Commission, "after carefully reviewing all available information" (App. B-2);

* * * concluded that there is adequate evidence concerning potential hazards to our environment and to man's health to require corrective action. Our Nation cannot afford to wait until the last piece of evidence has been submitted on the many issues related to pesticide usage. We must consider our present course of action in terms of future generations of Americans and the environment that they will live in.

These facts undoubtedly explain why the use of DDT on raw agricultural commodities is increasingly being prohibited by governmental authorities.⁵⁶

⁵⁵It was DDT contamination of coho salmon that led to the establishment of the Mrak Commission.

⁵⁶For example restrictive action has been ordered by the States of Arizona, California, Florida, Maryland, Michigan and Wisconsin, the Canadian federal government and several of the provinces, and by Sweden.

CONCLUSION

In light of the uncontroverted evidence that DDT is a carcinogen, this proceeding should be remanded to the Secretary with directions that he immediately take all action that is necessary to effect the elimination of that poison from raw agricultural commodities. Administrative proceedings conducted following remand should not be concerned with whether it is appropriate to continue, for any period of time, using DDT; rather, the Secretary should consider only the solution that should be implemented to afford the consuming public the greatest possible protection from continued exposure to that cancer-producing poison.

Respectfully submitted,

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SUPPLEMENT

The pertinent parts of the Food, Drug and Cosmetic Act, 52 Stat. 1040, as amended, 21 U.S.C. 301, *et seq.* are as follows:

**TOLERANCES FOR PESTICIDE CHEMICALS
IN OR ON RAW AGRICULTURAL
COMMODITIES**

Sec. 408 [346a]. (a) Any poisonous or deleterious pesticide chemical, or any pesticide chemical which is not generally recognized, among experts qualified by scientific training and experience to evaluate the safety of pesticide chemicals, as safe for use, added to a raw agricultural commodity, shall be deemed unsafe for the purposes of the application of clause (2) of section 402(a) unless—

(1) a tolerance for such pesticide chemical in or on the raw agricultural commodity has been prescribed by the Secretary of Health, Education and Welfare under this section and the quantity of such pesticide chemical in or on the raw agricultural commodity is within the limits of the tolerance so prescribed; or

(2) with respect to use in or on such raw agricultural commodity, the pesticide chemical has been exempted from the requirement of a tolerance by the Secretary under this section.

While a tolerance or exemption from tolerance is in effect for a pesticide chemical with respect to any raw agricultural commodity, such raw agricultural commodity shall not, by reason of bearing or containing any added amount of such pesticide chemical, be considered to be adulterated within the meaning of clause (1) of section 402(a).

(b) The Secretary shall promulgate regulations establishing tolerances with respect to the use in or on raw agricultural commodities of poisonous or deleterious pesticide chemicals and of pesticide chemicals which are not generally recognized, among experts qualified by scientific training and experience

to evaluate the safety of pesticide chemicals, as safe for use, to the extent necessary to protect the public health. In establishing any such regulation, the Secretary shall give appropriate consideration, among other relevant factors, (1) to the necessity for the production of an adequate, wholesome, and economical food supply; (2) to the other ways in which the consumer may be affected by the same pesticide chemical or by other related substances that are poisonous or deleterious; and (3) to the opinion of the Secretary of Agriculture as submitted with a certification of usefulness under subsection (1) of this section. Such regulations shall be promulgated in the manner prescribed in subsection (d) or (e) of this section. In carrying out the provisions of this section relating to the establishment of tolerances, the Secretary may establish the tolerance applicable with respect to the use of any pesticide chemical in or on any raw agricultural commodity at zero level if the scientific data before the Secretary does not justify the establishment of a greater tolerance.

(c) The Secretary shall promulgate regulations exempting any pesticide chemical from the necessity of a tolerance with respect to use in or on any or all raw agricultural commodities when such a tolerance is not necessary to protect the public health. Such regulations shall be promulgated in the manner prescribed in subsection (d) or (e) of this section.

(d) (1) Any person who has registered, or who has submitted an application for the registration of, an economic poison under the Federal Insecticide, Fungicide, and Rodenticide Act may file with the Secretary of Health, Education, and Welfare, a petition proposing the issuance of a regulation, establishing a tolerance for a pesticide chemical which constitutes, or is an ingredient of such economic poison, or exempting the pesticide chemical from the requirement of a tolerance. The petition shall contain data showing—

(A) the name, chemical identity, and composition of the pesticide chemical;

Supp. 3

(B) the amount, frequency, and time of application of the pesticide chemical;

(C) full reports of investigations made with respect to the safety of the pesticide chemical;

(D) the results of tests on the amount of residue remaining, including a description of the analytical methods used;

(E) practicable methods for removing residue which exceeds any proposed tolerance;

(F) proposed tolerances for the pesticide chemical if tolerances are proposed; and

(G) reasonable grounds in support of the petition.

Samples of the pesticide chemical shall be furnished to the Secretary upon request. Notices of the filing of such petition shall be published in general terms by the Secretary within thirty days after filing. Such notice shall include the analytical methods available for the determination of the residue of the pesticide chemical for which a tolerance or exemption is proposed.

(2) Within ninety days after a certification of usefulness by the Secretary of Agriculture under subsection (1) with respect to the pesticide chemical named in the petition, the Secretary of Health, Education, and Welfare shall, after giving due consideration to the data submitted in the petition or otherwise before him, by order make public a regulation—

(A) establishing a tolerance for the pesticide chemical named in the petition for the purposes for which it is so certified as useful, or

(B) exempting the pesticide chemical from the necessity of a tolerance for such purposes,

unless within such ninety-day period the person filing the petition requests that the petition be referred to an advisory committee or the Secretary within such period otherwise deems such referral necessary, in either of which events the provisions of paragraph (3) of this subsection shall apply in lieu hereof.

(3) In the event that the person filing the petition requests, within ninety days after a certification of usefulness

by the Secretary of Agriculture under subsection (1), with respect to the pesticide chemical named in the petition, that the petition be referred to an advisory committee, or in the event the Secretary of Health, Education, and Welfare within such period otherwise deems such referral necessary, the Secretary of Health, Education, and Welfare shall forthwith submit the petition and other data before him to an advisory committee to be appointed in accordance with subsection (g) of this section. As soon as practicable after such referral, but not later than sixty days thereafter, unless extended as hereinafter provided, the committee shall, after independent study of the data submitted to it by the Secretary and other data before it, certify to the Secretary a report and recommendations on the proposal in the petition to the Secretary, together with all underlying data and a statement of the reasons or basis for the recommendations. The sixty-day period provided for herein may be extended by the advisory committee for an additional thirty days if the advisory committee deems this necessary. Within thirty days after such certification, the Secretary shall, after giving due consideration to all data then before him, including such report, recommendations, underlying data, and statement, by order make public a regulation—

(A) establishing a tolerance for the pesticide chemical named in the petition for the purposes for which it is so certified as useful; or

(B) esempting the pesticide chemical from the necessity of a tolerance for such purposes

(4) The regulations published under paragraph (2) or (3) of this subsection will be effective upon publication.

(5) Within thirty days after publication, any person adversely affected by a regulation published pursuant to paragraph (2) or (3) of this subsection, or pursuant to subsection (e), may file objections thereto with the Secretary, specifying with particularity the provisions of the regulation deemed objectionable, stating reasonable grounds therefor, and requesting a public hearing upon such objections. A copy of the objections filed by a person other than the peti-

tioner shall be served on the petitioner, if the regulation was issued pursuant to a petition. The petitioner shall have two weeks to make a written reply to the objections. The Secretary shall thereupon, after due notice, hold such public hearing for the purpose of receiving evidence relevant and material to the issues raised by such objections. Any report, recommendations, underlying data, and reasons certified to the Secretary by an advisory committee shall be made a part of the record of the hearing, if relevant and material, subject to the provisions of section 7(c) of the Administrative Procedure Act (5 U.S.C., sec. 1006(c)). The National Academy of Sciences shall designate a member of the advisory committee to appear and testify at any such hearing with respect to the report and recommendations of such committee upon request of the Secretary, the petitioner, or the officer conducting the hearing: *Provided*, That this shall not preclude any other member of the advisory committee from appearing and testifying at such hearing. As soon as practicable after completion of the hearing, the Secretary shall act upon such objections and by order make public a regulation. Such regulation shall be based only on substantial evidence of record at such hearing, including any report, recommendations, underlying data, and reasons certified to the Secretary by an advisory committee, and shall set forth detailed findings of fact upon which the regulation is based. No such order shall take effect prior to the ninetieth day after its publication, unless the Secretary finds that emergency conditions exist necessitating an earlier effective date, in which even the Secretary shall specify in the order his findings as to such conditions.

(e) The Secretary may at any time, upon his own initiative or upon the request of any interested parson, propose the issuance of a regulation establishing a tolerance for a pesticide chemical or exempting it from the necessity of a tolerance. Thirty days after publication of such a proposal, the Secretary may by order publish a regulation based upon the proposal which shall become effective upon pub-

lication unless within such thirty-day period a person who has registered, or who has submitted an application for the registration of, an economic poison under the Federal Insecticide, Fungicide, and Rodenticide Act containing the pesticide chemical named in the proposal, requests that the proposal be referred to an advisory committee. In the event of such a request, the Secretary shall forthwith submit the proposal and other relevant data before him to an advisory committee to be appointed in accordance with subsection (g) of this section. As soon as practicable after such referral, but not later than sixty days thereafter, unless extended as hereinafter provided, the committee shall, after independent study of the data submitted to it by the Secretary and other data before it, certify to the Secretary a report and recommendations on the proposal together with all underlying data and a statement of the reasons or basis for the recommendations. The sixty-day period provided for herein may be extended by the advisory committee for an additional thirty days if the advisory committee deems this necessary. Within thirty days after such certification, the Secretary may, after giving due consideration to all data before him, including such reports, recommendations, underlying data and statement, by order publish a regulation establishing a tolerance for the pesticide chemical named in the proposal or exempting it from the necessity of a tolerance which shall become effective upon publication. Regulations issued under this subsection shall upon publication be subject to paragraph (5) of subsection (d).

(f) All data submitted to the Secretary or to an advisory committee in support of a petition under this section shall be considered confidential by the Secretary and by such advisory committee until publication of a regulation under paragraph (2) or (3) of subsection (d) of this section. Until such publication, such data shall not be revealed to any person other than those authorized by the Secretary or by an advisory committee in the carrying out of their official duties under this section.

(g) Whenever the referral of a petition or proposal to an advisory committee is requested under this section, or the Secretary otherwise deems such referral necessary, the Secretary shall forthwith appoint a committee of competent experts to review the petition or proposal and to make a report and recommendations thereon. Each such advisory committee shall be composed of experts, qualified in the subject matter of the petition and of adequately diversified professional background selected by the National Academy of Sciences and shall include one or more representatives from land-grant colleges. The size of the committee shall be determined by the Secretary. Members of an advisory committee shall receive as compensation for their services a reasonable per diem, which the Secretary shall by rules and regulations prescribe, for time actually spent in the work of the committee, and shall in addition be reimbursed for their necessary traveling and subsistence expenses while to serving away from their places of residence. The members shall not be subject to any other provisions of law regarding the appointment and compensation of employees of the United States. The Secretary shall furnish the committee with adequate clerical and other assistance, and shall by rules and regulations prescribe the procedures to be followed by the committee.

(h) A person who has filed a petition or who has requested the referral of a proposal to an advisory committee in accordance with the provision of this section, as well as representatives of the Department of Health, Education, and Welfare, shall have the right to consult with any advisory committee provided for in subsection (g) in connection with the petition or proposal.

(i) (1) In a case of actual controversy as to the validity of of any order under subsection (d) (5), (e), or (1) any person who will be adversely affected by such order may obtain judicial review by filing in the United States Court of Appeals for the circuit wherein such person resides or has his principal place of business, or in the United States Court of Appeals for the District of Columbia Circuit, within 60

days after entry of such order, a petition praying that the order be set aside in whole or in part.

(2) In the case of a petition with respect to an order under subsection (d) (5) or (e), a copy of the petition shall be forthwith transmitted by the clerk of the court to the Secretary, or any officer designated by him for that purpose, and thereupon the Secretary shall file in the court the record of the proceedings on which he based his order, as provided in section 2112 of title 28, United States Code. Upon the filing of such petition, the court shall have exclusive jurisdiction to affirm, or set aside the order complained of in whole or in part. The findings of the Secretary with respect to questions of fact shall be sustained if supported by substantial evidence when considered on the record as a whole, including any report and recommendation of an advisory committee.

(3) In the case of a petition with respect to an order under subsection (1), a copy of the petition shall be forthwith transmitted by the clerk of the court to the Secretary of Agriculture, or any officer designated by him for that purpose, and thereupon the Secretary shall file in the court the record of the proceedings on which he based his order, as provided in section 2112 of title 28, United States Code. Upon the filing of such petition, the court shall have exclusive jurisdiction to affirm or set aside the order complained of in whole or in part. The findings of the Secretary with respect to questions of fact shall be sustained if supported by substantial evidence when considered on the record as a whole.

(4) If application is made to the court for leave to adduce additional evidence, the court may order such additional evidence to be taken before the Secretary of Health, Education, and Welfare or the Secretary of Agriculture as the case may be, and to be adduced upon the hearing in such terms and conditions as to the court may seem proper, if such evidence is material and there were reasonable grounds for failure to adduce such evidence in the proceedings below. The Secretary of Health, Education, and Welfare or the Sec-

retary of Agriculture, as the case may be, may modify his findings as to the facts and order by reason of the additional evidence so taken, and shall file with the court such modified findings and order.

(5) The judgment of the court affirming or setting aside, in whole or in part, any order under this section shall be final, subject to review by the Supreme Court of the United States upon certiorari or certification as provided in section 1254 of title 28 of the United States Code. The commencement of proceedings under this section shall not, unless specifically ordered by the court to the contrary, operate as a stay of an order. The court shall advance on the docket and expedite the disposition of all causes filed therein pursuant to this section.

(j) The Secretary may, upon the request of any person who has obtained an experimental permit for a pesticide chemical under the Federal Insecticide, Fungicide, and Rodenticide Act or upon his own initiative, establish a temporary tolerance for the pesticide chemical for the use covered by the permit whenever in his judgment such action is deemed necessary to protect the public health, or may temporarily exempt such pesticide chemical from a tolerance. In establishing such a tolerance, the Secretary shall give due regard to the necessity for experimental work in developing an adequate, wholesome, and economical food supply and to the limited hazard to the public health involved in such work when conducted in accordance with applicable regulations under the Federal Insecticide, Fungicide, and Rodenticide Act.

(k) Regulations affecting pesticide chemicals in or on raw agricultural commodities which are promulgated under the authority of section 406(a) upon the basis of public hearings instituted before January 1, 1953, in accordance with section 702(e), shall be deemed to be regulations under this section and shall be subject to amendment or repeal as provided in subsection (m).

(l) The Secretary of Agriculture, upon request of any person who has registered, or who has submitted an applica-

tion for the registration of, an economic poison under the Federal Insecticide, Fungicide, and Rodenticide Act, and whose request is accompanied by a copy of a petition filed by such person under subsection (d) (1) with respect to a pesticide chemical which constitutes, or is an ingredient of, such economic poison, shall, within thirty days or within sixty days if upon notice prior to the termination of such thirty days the Secretary deems it necessary to postpone action for such period, on the basis of data before him, either—

(1) certify to the Secretary of Health, Education, and Welfare that such pesticide chemical is useful for the purpose for which a tolerance or exemption is sought; or

(2) notify the person requesting the certification of his proposal to certify that the pesticide chemical does not appear to be useful for the purpose for which a tolerance or exemption is sought, or appears to be useful for only some of the purposes for which a tolerance or exemption is sought.

In the event that the Secretary of Agriculture takes the action described in clause (2) of the preceding sentence, the person requesting the certification, within one week after receiving the proposed certification, may either (A) request the Secretary of Agriculture to certify to the Secretary of Health, Education, and Welfare on the basis of the proposed certification; (B) request a hearing on the proposed certification or the parts thereof objected to; or (C) request both such certification and such hearing. If no such action is taken, the Secretary may by order make the certification as proposed. In the event that the action described in clause (A) or (C) is taken, the Secretary shall by order make the certification as proposed with respect to such parts thereof as are requested. In the event a hearing is requested, the Secretary of Agriculture shall provide opportunity for a prompt hearing. The certification of the Secretary of Agriculture as the result of such hearing shall be made by order and shall be based only on substantial evidence of record at the hearing and shall set forth detailed findings of

fact. In no event shall the time elapsing between the making of a request for a certification under this subsection and final certification by the Secretary of Agriculture exceed one hundred and sixty days. The Secretary shall submit to the Secretary of Health, Education, and Welfare with any certification of usefulness under this subsection an opinion based on the data before him, whether the tolerance or exemption proposed by the petitioner reasonably reflects the amount of residue likely to result when the pesticide chemical is used in the manner proposed for the purpose for which the certification is made. The Secretary of Agriculture, after due notice and opportunity for public hearing, is authorized to promulgate rules and regulations for carrying the provisions of this subsection.

(m) The Secretary of Health, Education, and Welfare shall prescribe by regulations the procedure by which regulations under this section may be amended or repealed, and such procedure shall conform to the procedure provided in this section for the promulgation of regulations establishing tolerances, including the appointment of advisory committees and the procedure for referring petitions to such committees.

(n) The provisions of section 303(c) of the Federal Food, Drug and Cosmetic Act with respect to the furnishing of guaranties shall be applicable to raw agricultural commodities covered by this section.

(o) The Secretary of Health, Education, and Welfare shall by regulation require the payment of such fees as will in the aggregate, in the judgment of the Secretary, be sufficient over a reasonable term to provide, equip, and maintain an adequate service for the performance of the Secretary's functions under this section. Under such regulations, the performance of the Secretary's services or other functions pursuant to this section, including any one or more of the following, may be conditioned upon the payment of such fees: (1) the acceptance of filing of a petition submitted under subsection (d); (2) the promulgation of a regulation establishing a tolerance, or an exemption from the necessity

of a tolerance, under this section, or the amendment or repeal of such a regulation; (3) the referral of a petition or proposal under this section to an advisory committee; (4) the acceptance for filing of objections under subsection (d) (5); or (5) the certification and filing in court of a transcript of the proceedings and the record under subsection (i) (2). Such regulations may further provide for waiver or refund of fees in whole or in part when in the judgment of the Secretary such waiver or refund is equitable and not contrary to the purposes of this subsection.

This Act shall take effect upon the date of its enactment [July 22, 1954] except that with respect to pesticide chemicals for which tolerances or exemptions have not been established under section 408 of the Federal Food, Drug, and Cosmetic Act, the amendment to section 402(a) of such Act made by section 2 of this Act shall not be effective—

(1) for the period of one year following the date of the enactment of this Act; or

(2) for such additional period following such period of one year, but not extending beyond two years after the date of the enactment of this Act, as the Secretary of Health, Education, and Welfare may prescribe on the basis of a finding that conditions exist which necessitate the prescribing of such additional period.

FOOD ADDITIVES

Unsafe Food Additives

Sec. 409 [348]. (a) A food additive shall, with respect to any particular use or intended use of such additives, be deemed to be unsafe for the purposes of the application of clause (2)(C) of section 402(a), unless—

(1) it and its use or intended use conform to the terms of an exemption which is in effect pursuant to subsection (i) of this section; or

(2) there is in effect, and it and its use or intended use are in conformity with, a regulation issued under this section prescribing the conditions under which such additive may be safely used.

While such a regulation relating to a food additive is in effect, a food shall not, by reason of bearing or containing such an additive in accordance with the regulation, be considered adulterated within the meaning of clause (1) of section 402(a).

* * *

Action on the Petition

(c)

* * *

(3) No such regulation shall issue if a fair evaluation of the data before the Secretary—

(A) fails to establish that the proposed use of the food additive, under the conditions of use to be specified in the regulation, will be safe: *Provided*, That no additive shall be deemed to be safe if it is found to induce cancer when ingested by man or animal, or if it is found, after tests which are appropriate for the evaluation of the safety of food additives, to induce cancer in man or animal, except that this proviso shall not apply with respect to the use of a substance as an ingredient of feed for animals which are raised for food production, if the Secretary finds (i) that, under the conditions of use and feeding specified in proposed labeling and reasonably certain to be followed in practice, such additive will not adversely affect the animals for which such feed is intended, and (ii) that no residue of the additive will be found (by methods of examination prescribed or approved by the Secretary by regulations, which regulations shall not be subject to subsections (f) and (g)) in any edible portion of such animal after slaughter or in any food yielded by or derived from the living animal; or

(B) shows that the proposed use of the additive would promote deception of the consumer in violation of this Act or would otherwise result in adulteration or in misbranding of food within the meaning of this Act.

* * *

LISTING AND CERTIFICATION OF COLOR ADDITIVES FOR FOODS, DRUGS, AND COSMETICS

When Color Additives Deemed Unsafe

Sec. 706 [376]. (a) A Color additive shall, with respect to any particular use (for which it is being used or intended to be used or is represented as suitable) in or on food or drugs or cosmetics, be deemed unsafe for the purposes of the application of section 402(c), section 501(a)(4), or section 601(e), as the case may be unless—

(1) (A) there is in effect, and such additive and such use are in conformity with, a regulation issued under subsection (b) of this section listing such additive for such use, including any provision of such regulation prescribing the conditions under which such additive may be safely used, and (B) such additive either (i) is from a batch certified, in accordance with regulations issued pursuant to subsection (c), for such use, or (ii) has, with respect to such use, been exempted by the Secretary from the requirement of certification; or

(2) such additive and such use thereof conform to the terms of an exemption which is in effect pursuant to subsection (f) of this section.

* * *

(B) A color additive (i) shall be deemed unsafe, and shall not be listed, for any use which will or may result in ingestion of all or part of such additive, if the additive is found by the Secretary to induce cancer when ingested by man or animal, or if it is found by the Secretary, after tests which are appropriate for the evaluation of the safety of addi-

tives for use in food, to induce cancer in man or animal, and (ii) shall be deemed unsafe, and shall not be listed, for any use which will not result in ingestion of any part of such additive, if, after tests which are appropriate for the evaluation of the safety of additives for such use, or after other relevant exposure of man or animal to such additive, it is found by the Secretary to induce cancer in man or animal: *Provided*, That clause (i) of this subparagraph (b) shall not apply with respect to the use of a color additive as an ingredient of feed for animals which are raised for food production, if the Secretary finds that, under the conditions of use and feeding specified in proposed labeling and reasonably certain to be followed in practice, such additive will not adversely affect the animals for which such feed is intended, and that no residue of the additive will be found (by methods of examination prescribed or approved by the Secretary by regulations, which regulations shall not be subject to subsection (d)) in any edible portion of such animals after slaughter or in any food yielded by or derived from the living animal.

* * *

The pertinent parts of the administrative regulations promulgated in implementation of the Food, Drug and Cosmetic Act, 21 CFR Part 120, are as follows:

§ 120.5 Zero tolerances.

A zero tolerance means that no amount of the pesticide chemical may remain on the raw agricultural commodity when it is offered for shipment. A zero tolerance for a pesticide chemical in or on a raw agricultural commodity may be established because, among other reasons:

(a) A safe level of the pesticide chemical in the diet of two different species of warm-blooded animals has not been reliably determined.

(b) The chemical is carcinogenic to or has other alarming physiological effects upon one or more of the species of the test animals used, when fed in the diet of such animals.

(c) The pesticide chemical is toxic, but is normally used at times when, or in such manner that, fruit, vegetables, or other raw agricultural commodities will not bear or contain it.

(d) All residue of the pesticide chemical is normally removed through good agricultural practice such as washing or brushing or through weathering or other changes in the chemical itself, prior to introduction of the raw agricultural commodity into interstate commerce.

* * *

§ 120.32 Procedure for amending and repealing tolerances or exemptions from tolerances.

(a) The Commissioner on his own initiative or on request from an interested person furnishing reasonable grounds therefor, may propose the issuance of a regulation amending or repealing a tolerance for a pesticide chemical on raw agricultural commodities or granting or repealing an exemption from tolerance for such chemical. Requests for such amendment or repeal shall be made in writing and accompanied by an advance deposit to cover fees as provided in § 120.33(d).

(b) Reasonable grounds shall include an explanation showing wherein the person has a substantial interest in such tolerance or exemption from tolerance and an assertion of facts (supported by data if available) showing that new uses for the pesticide chemical have been developed or old uses abandoned, that new data are available as to toxicity of the chemical, or that experience with the application of the tolerance or exemption from tolerance may justify its amendment or repeal. Evidence that a person has registered or has submitted an application for the registration of an economic poison under the Federal Insecticide, Fungicide, and Rodenticide Act will be regarded as evidence that he has a substantial interest in a tolerance or exemption from the requirement of a

tolerance for a pesticide chemical that consists in whole or in part of the economic poison. New data should be furnished in the form specified in § 120.7(b) for submitting petitions.

(c) The notice announcing the proposal to amend or repeal a regulation shall show whether the proposal was made on the initiative of the Commissioner or at the request of an interested person, naming such person. From this point the proceedings shall be the same as prescribed by section 408(e), beginning with the second sentence of that paragraph, and the regulations applicable to section 408(d), (e), (f), and (g).

* * *

§ 120.147 DDT; tolerances for residues.

Tolerances for residues of the insecticide DDT (a mixture of 1,1,1,-trichloro-2,2-bis(*p*-chlorophenyl)ethane and 1,1,1-trichloro-2-(*o*-chlorophenyl)-2-(*p*-chlorophenyl)ethane are established in or on raw agricultural commodities as follows:

50 parts per million in or on peppermint hay and spearmint hay, which are not to be used for feeding livestock.

20 parts per million in or on fresh hops. Any byproducts or refuse from such hops are not to be used for feeding livestock.

7 parts per million in or on apples, apricots, beans, beet greens, blueberries (huckleberries), cabbage, celery, collards, cranberries, cucumbers, eggplants; fat of meat from cattle, goats, hogs, horses, and sheep; grapes, kale, lettuce, mangoes, melons, mustard greens, nectarines, okra, onions, parsnip greens, peaches, pears, peas, peppers, pineapples, pumpkins, quinces, radish tops, rutabaga tops, spinach, squash, summer squash, sweetpotatoes (from postharvest use), Swiss chard, tomatoes, turnip greens.

4 parts per million in or on cottonseed.

3.5 parts per million in or on avocados, carrots, cherries, citrus fruits, the fresh vegetable sweet corn (determined on kernels plus cob after removing any husk present when marketed), papayas, plums (fresh prunes).

3.5 parts per million combined residues of DDT and toxaphene in or on soybeans (dry form), of which residues DDT shall not exceed 1.5 parts per million and toxaphene shall not exceed 2 parts per million.

1.5 parts per million in or on soybeans (dry form).

1 part per million in or on artichokes, asparagus, beets (roots), blackberries, boysenberries, broccoli, brussels sprouts, cauliflower, currants, dewberries, endive (escarole), gooseberries, guavas, kohlrabi, loganberries, mushrooms, parsnips (roots), peanuts, potatoes (determined after washing off any soil present when marketed), radishes (roots), raspberries, rutabagas (roots), strawberries, turnips (roots), youngberries. [33 F.R. 9396, June 27, 1968]

§ 120.147a DDT residues in corn forage, corn fodder, corn silage, corn stover, and sweet corn cannery waste; statement of policy and interpretation.

(a) Section 120.101(e)(4) of this chapter, promulgated on March 11, 1955, permitted a tolerance of 7 parts per million for residues of DDT in or on the fresh vegetable sweet corn. Because of a showing of the unsuitability of the tolerance level based on sweet corn as marketed, § 120.147 provides a tolerance of 3.5 parts per million of DDT in or on the fresh vegetable sweet corn (determined on kernels plus cob after removing any husk present when marketed). Residue studies have indicated that the application of DDT in any manner to the feed of dairy cows or to the dairy cows themselves results in residues of DDT in milk. No tolerance has been established to permit any residues of DDT in milk from feeding corn forage, corn fodder, corn silage, corn stover, or sweet corn cannery waste to dairy cows. When these items contain any amount of DDT, they are unsuitable as a feed for dairy cows and should not be represented, sold, or used for that purpose.

(b) A tolerance of 7 parts per million for residues of DDT in the fat of meat from cattle, goats, hogs, horses, and sheep has been established in § 120.147. Animals that consume

corn forage, corn fodder, corn silage, corn stover, or sweet corn cannery waste containing DDT may accumulate considerably more of the chemical in their fat than is present in the feed itself, and a long time may be required on a diet free of DDT to reduce excessive levels of DDT to the tolerance level. Unless the person who raises meat animals is in a position to determine the magnitude of DDT residues in these corn feed products and to insure that the conditions of feeding are such that the residues in meat from such animals will be within the established tolerance, these products from DDT-treated corn should not be used in the feeding of meat animals.

(See also § 121.226 of this chapter.)

[27 F.R. 12092, Dec. 6, 1962, as amended at 32 F.R. 4059, Mar. 15, 1967]

§ 120.147b DDT residues in apple pomace.

(a) Investigations by the Food and Drug Administration show that apple pomace containing substantial amounts of DDT has been used as feed for dairy and meat animals. Section 409 of the act would render illegal any apple pomace for animal feeding that contains DDT in excess of the 7 parts per million fixed for apples by § 120.147. It has been established that the feeding of apple pomace containing DDT will contribute residues of DDT to the fat of meat animals and to milk of dairy animals.

(b) There is no tolerance for DDT in milk to provide for residues that may occur from feeding apple pomace which contains DDT to dairy animals. Apple pomace containing DDT should not be fed to dairy animals, since it has been established that the ingestion by them of even small amounts of DDT results in contamination of the milk with this pesticide. Apple pomace containing any amount of DDT is unsuitable as a feed for an ingredient of mixed feeds for dairy animals and should not be represented, sold, or used for that purpose.

(c) There is an established legal tolerance of 7 parts per million for residues of DDT in or on the fat of meat from

cattle, goats, sheep, horses, and hogs (§ 120.147). Animals that consume DDT in feed may accumulate considerably more of the chemical in their fat than is present in the feed itself, and a long time may be required on a diet free of DDT to reduce excessive residues to the tolerance level. It has not been established under what conditions of feeding, if any, apple pomace containing less than 7 parts per million of DDT can be fed to animals without causing the meat from such animals to contain residues in excess of the tolerance. Therefore, unless a grower of meat animals is in a position to establish that the DDT residue in the apple pomace and the conditions of feeding are such that the meat from such animals will be within the established tolerance, apple pomace should not be used in the feeding of meat animals.

[27 F.R. 12092, Dec. 6, 1962, as amended at 32 F.R. 4059, Mar. 15, 1967]

§ 120.147c DDT and its related degradation products in milk.

Tolerances of 0.05 part per million are established for residues in milk for each or any combination of the following: DDT, DDD (1,1-dichloro-2,2-bis (*p*-chlorophenyl) ethane), and DDE (1,1-dichloro-2,2-bis (*p*-chlorophenyl) ethylene). These tolerances are not established to provide for residues from the purposeful use of DDT, DDD, or DDE on dairy cattle, in dairy barns, or on the crops intended to be used for feeding dairy cattle.

[32 F.R. 4060, Mar. 15, 1967]

* * *

IN THE
UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 23,813

ENVIRONMENTAL DEFENSE FUND, INCORPORATED; SIERRA CLUB;
WEST MICHIGAN ENVIRONMENTAL ACTION COUNCIL; NATIONAL
AUDUBON SOCIETY, and IZAAK WALTON LEAGUE OF AMERICA,
Petitioners,

v.

CLIFFORD M. HARDIN, Secretary of Agriculture,
and UNITED STATES DEPARTMENT OF AGRICULTURE,
Respondents.

Petition for Review of Order of the
United States Department of Agriculture

BRIEF FOR PETITIONERS AND APPENDIX

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TABLE OF CONTENTS

	<u>Page</u>
JURISDICTION	1
ISSUES PRESENTED FOR REVIEW	1
PREVIOUS CONSIDERATION BY THIS COURT	2
REFERENCES TO RULINGS	2
STATUTES AND REGULATIONS INVOLVED	2
STATEMENT OF THE CASE	3
ARGUMENT	10
I. Respondents Have Erred in Denying Petitioners' Request That They Issue Notices Under Section 4c of FIFRA To Commence Administrative Proceedings by Which Registrations of All Economic Poisons That Contain DDT Could Be Cancelled	10
A. The Respondents Must Issue Section 4c Notices Because They Have Made a Finding That Wide-spread DDT Use Should Be Discontinued	10
B. Respondents Must Issue Section 4c Notices for Economic Poisons Containing DDT Because the Evidence Before Them Compels a Finding That DDT's Use Should Be Discontinued	14
II. Respondents Have Erred in Denying Petitioners' Request That They Suspend DDT Registrations Immediately and for the Duration of Section 4c Cancellation Proceedings	19
A. Respondents Are Compelled To Find That DDT Is an Imminent Hazard to the Public	20
B. Because of the Seriousness and Nature of the Facts upon Which Respondents Are Compelled To Find DDT Is an Imminent Hazard to the Public, They Are Compelled To Suspend DDT Registrations	24
III. Petitioners Have Standing To Obtain Review	26
A. FIFRA Contemplates Public Participation in Its Proceedings	27

	<u>Page</u>
B. The Petitioners Have Exhibited the Requisite Interest in DDT	30
IV. There Is a Final Order Before the Court for Review	31
A. Respondents' Order Is a Final Reviewable Order Even Though It Does Not Come at the End of Section 4c Proceedings	33
B. Respondents' Order Is a Final Reviewable Order Even Though It Is Not Based on a Record Developed During a Section 4c Proceeding	35
C. The Fact That Respondents Have Initiated Section 4c Proceedings for Only Four Uses of DDT Supports Petitioners' Contention That There Is a Final Order	36
D. The Fact That Respondents' Order Was in Part in Letter Form Is Irrelevant to Final Order Question	37
CONCLUSION	37
ADDENDUM:	
Sections 2-4 of the Federal Insecticide, Fungicide and Rodenticide Act, 7 U.S.C. Sections 135-135b, 61 Stat. 168, as amended	1 Add.
APPENDIX:	
Petition Requesting the Suspension and Cancellation of Registration of Economic Poisons Containing DDT ("Petition") (Filed with Respondents October 31, 1969)	1 App.
Appendix A to Above Petition. List of Authorities	20 App.
Appendix E to Above Petition, Affidavit of Dr. Charles F. Wurster	28 App.
Letter, November 10, 1969 from Ned D. Bayley to James W. Moorman	33 App.
Order of December 11, 1969 of Respondents, Including:	
a. Letter of December 11, 1969 from Ned D. Bayley to James W. Moorman	36 App.

	<u>Page</u>
b. Secretary's [of Agriculture] Memorandum No. 1666 of October 23, 1969	36 App.
c. Press Release of Department of Agriculture (USDA 3508-69) of November 13, 1969	38 App.
d. Pesticides Registration Notice 69-17 of November 20, 1969	40 App.
e. Federal Register Notice (34 F.R. 18827) of November 25, 1969	43 App.

TABLE OF CITATIONS

CASES:

Abbott Laboratories v. Gardner, 387 U.S. 136 (1967)	33, 34, 36
*Algonquin Gas Transmission Company v. F.P.C., 201 F.2d 334 (1st Cir. 1953)	33
*Bell v. Goodard, 366 F.2d 177 (7th Cir. 1969)	23
*Cities Service Gas Co. v. F.P.C., 255 F.2d 860 (10th Cir. 1956)	33
Citizens Committee for the Hudson Valley v. Volpe, 302 F.Supp. 1083 (S.D.N.Y. 1969)	26, 27
Columbia Broadcasting System v. United States, 316 U.S. 407 (1942)	33
Curran v. Laird, ___ App. D.C. ___, ___ F.2d ___ (No. 21,040 D.C. Cir., Nov. 12, 1969 (en banc))	26
Foti v. Immigration and Naturalization Service, 375 U.S. 217 (1963)	34
Hardin v. Kentucky Utilities Co., 370 U.S. 1 (1968)	26
*Isbrandtsen Co. v. United States, 93 App. D.C. 293, 211 F.2d 51 (1954)	33, 37
Murphy v. Butler, 362 U.S. 929 (1960)	15, 20
Nashville I-40 Steering Committee v. Ellington, 387 F.2d 179 (6th Cir. 1967)	26
Norwalk Core v. Norwalk Redevelopment Agency, 395 F.2d 920 (2nd Cir. 1968)	26

*Office of Communication of the United Church of Christ v. Federal Communications Commission, 123 App. D.C. 328 359 F.2d 994 (1966)	26, 30, 31
Parker v. United States, ____ F.Supp. ____ (No. C-1368, D.C. Colo., Dec. 24, 1969)	27
*Phillips Petroleum Co. v. F.P.C., 227 F.2d 470 (10th Cir. 1955), <i>cert. denied</i> , 350 U.S. 1005 (1955)	33, 34, 37
Powelton Civic Home Owners Ass'n v. Department of Housing and Urban Development, 284 F.Supp. 809 (E.D. Penn. 1968)	26
Road Review League, Town of Bedford v. Boyd, 270 F.Supp. 650 (S.D.N.Y. 1967)	26
*Scenic Hudson Preservation Conference v. Federal Power Commission, 354 F.2d 608 (2d Cir. 1965)	26, 30, 31
Schenley Industries Inc. v. Fowler, 275 F.Supp. 356 (D.C. D.C. 1967)	37
Sierra Club v. Hickel, ____ F.Supp. ____ (No. 51464, N.D. Calif., July 23, 1969)	27
*Trailways of New England, Inc. v. C.A.B., 412 F.2d 926 (1st Cir. 1969)	33
*Trans-Pacific Freight Conference of Japan v. F.M.B., 112 App. D.C. 290, 302 F.2d 875 (D.C. Cir. 1962)	33
United States v. Bass, 215 F.2d 9 (8th Cir. 1954)	37

STATUTES:

Federal Statutes:

Administrative Procedure Act:

Section 2, 60 Stat. 237 as amended, 5 U.S.C. § 551	32
Section 10a, 60 Stat. 243 as amended, 5 U.S.C. § 702	28
Section 10b, 5 U.S.C. § 703	34

Endangered Species Act:

Section 1, 80 Stat. 926, 16 U.S.C. § 668aa	21
--	----

Federal Insecticide, Fungicide, and Rodenticide Act, Sections 2-4, 61 Stat. 166ff, as amended by 79 Stat.

190ff, 7 U.S.C. §§ 135-135b	<i>passim</i>
---------------------------------------	---------------

	<u>Page</u>
Food, Drug and Cosmetic Act:	
72 Stat. 948, 21 U.S.C. 346b	23
Section 409c3 A, 72 Stat. 1785, as amended, 21 U.S.C. 348(c)(3)(A)	21
Section 706b5B, 74 Stat. 399, 21 U.S.C. 366(b)(5)(B) . .	21-22
<i>State Statutes:</i>	
Agricultural Code of California, 12824, 14005	18
Fla. Stat. § 487.042	19
5 Ill. Stat. Ann. § 87d.5	18
286.162 Mich. Comp. Laws Ann., Sec. 2(z)(1)(2)(1)- (2)()	18
<u>REGULATIONS AND DECISIONS:</u>	
7 C.F.R. 362.9	11
362.10(k)	11
362.105(c)	11
362.105(h)	11
362.106(f)(4)(r)	11
362.108(c)(6)	11
362.121(g)	11
364.23(a), 34 F.R. 13823 Aug. 29, 1969	25
<u>LEGISLATIVE MATERIALS:</u>	
109 Cong. Rec. 20079	10, 24, 28
110 Cong. Rec. 2948-49	10, 17, 20, 24
110 Cong. Rec. 7189	17, 20, 28
Hearings on H.R. 7624 and S. 2197, Committee on Inter- state and Foreign Commerce, 86th Cong., 2d Sess.	23

	<u>Page</u>
Hearings on Regulation of Economic Poisons, House Subcommittee on Department Oversight and Consumer Relations of the Committee on Agriculture, Aug. 21-23, 1963, 88th Cong., 1st Sess.	28, 29
H. Rept. No. 313, 80th Cong., 1st Sess. (1947)	10, 27
H. Rept. No. 1761, 86th Cong., 2d Sess. (1960)	22
H. Rept. 1125 on H.R. 9739, 88th Cong., 2d Sess.	10, 16, 27, 28
H. Rept. 91-637, 91st Cong., 1st Sess. (1969)	12, 13, 14, 17, 18, 25, 26
S. Rept. No. 573, 88th Cong., 1st Sess. (1963)	
 <u>BOOKS AND PERIODICALS:</u>	
Allen, <i>The Congressional Intent To Protest Test: A Judicial Lowering of the Standing Barrier</i> , 41 Colo. L. Rev. 96 (1969)	27
Berger, <i>Standing To Sue in Public Actions: Is It a Constitutional Requirement?</i> , 78 Yale L. J. 816 (1969)	27
Allen, <i>The Congressional Intent To Protest Test: A Judicial Lowering of the Standing Barrier</i> , 41 Colo. L. Rev. 96 (1969)	27
Berger, <i>Standing To Sue in Public Actions: Is It a Constitutional Requirement?</i> , 78 Yale L. J. 816 (1969)	27
Jaffe, <i>Judicial Control of Administrative Action</i> , Little, Brown and Company, Boston (1965)	27, 34
Reich, <i>The Law of the Planned Society</i> , 75 Yale L. J. 1227 (1966)	27
Rogers, <i>The Need for Meaningful Control in the Management of Federally Owned Timberland</i> , 4 Land & Water L. Rev. 121 (1969)	27
 <u>MISCELLANEOUS:</u>	
CCH Food, Drug, and Cosmetic Law Reporter, § 59, 109.03 . . .	23
114 House of Commons (Canada) Debates 393, 28th Parliament, 2d Sess., Nov. 3, 1969	19

	<u>Page</u>
Ontario Order in Council 3654/69	19
Petitioners' Brief in Environmental Defense Fund v. Finch, No. 23812	2, 5, 23
Report of November, 1969, of the Commission of the Sec- retary of Health, Education and Welfare on Pesticides and Their Relationship to Environmental Health (Mrak Report)	passim

IN THE
UNITED STATES COURT OF APPEALS
 FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 23,813

ENVIRONMENTAL DEFENSE FUND, INCORPORATED; SIERRA CLUB;
 WEST MICHIGAN ENVIRONMENTAL ACTION COUNCIL; NATIONAL
 AUDUBON SOCIETY, and IZAAK WALTON LEAGUE OF AMERICA,
Petitioners,

v.

CLIFFORD M. HARDIN, Secretary of Agriculture,
 and UNITED STATES DEPARTMENT OF AGRICULTURE,
Respondents.

Petition for Review of Order of the
 United States Department of Agriculture

BRIEF FOR PETITIONERS

JURISDICTION

The jurisdiction of this Court rests on Section 4d of the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, 7 U.S.C. § 135b(d), 61 Stat. 168, as amended by 78 Stat. 190.

ISSUES PRESENTED FOR REVIEW

1. Whether Respondents have erred in denying Petitioners' request that they issue notices under Section 4c of the Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. § 135b(c), to commence administrative proceedings by which the registrations of all economic poisons containing DDT could be cancelled, where (a) the Respondents have found that widespread DDT use should be discontin-

ued, and (b) the evidence before the Respondents compels such a finding.

2. Whether Respondents have erred in denying Petitioners' request that they suspend DDT registrations immediately for the duration of Section 4c cancellation proceedings where the evidence before Respondents is that DDT is an imminent hazard to the public.

3. Whether the Petitioners have standing to obtain review.

4. Whether there is a reviewable order before the Court.

PREVIOUS CONSIDERATION BY THIS COURT

This cause was previously before a panel including Chief Judge Bazelon and Judge Robinson on Respondents' Motion To Dismiss and Respondents' Motion for Reconsideration of Order Deferring Ruling on Motion To Dismiss. An order was entered on January 29, 1970, deferring consideration of the Motion To Dismiss. A related cause, *Environmental Defense Fund, Inc. v. Finch*, No. 23812, involving many of the same factual issues, is also before this Court for consideration at this time.

REFERENCES TO RULINGS

The Order of December 11, 1969, of the Respondents, including four attachments, is set forth at pp. 36-45 of the Appendix hereto.

STATUTES AND REGULATIONS INVOLVED

Sections 2-4 of the Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. §§ 135-135b, 61 Stat. 168, as amended by 78 Stat. 190, is attached as an addendum to this brief.

STATEMENT OF THE CASE

The Parties. The Petitioners are five groups actively engaged in environmental protection. Their activities include a long-term involvement in efforts to control the environmental pollution caused by DDT and other persistent pesticides. They have participated in proceedings in a variety of jurisdictions to limit the use of DDT.

The Environmental Defense Fund is made up of scientists and other citizens dedicated to the protection of the environment on behalf of the public, employing legal action where necessary. It has participated in hearings on DDT in various jurisdictions. Its Scientists Advisory Committee, with more than 200 members, including some of the world's foremost environmental scientists, assures that positions taken are thoroughly supported by scientific evidence. (App. 1-2). The Sierra Club, which has a membership of 80,000, is devoted to the preservation of scenic resources, forests, waters, wildlife and wilderness. The Sierra Club has participated in several citizens' campaigns and legal actions to preserve the environment and has become well known for these efforts. (App. 2). The National Audubon Society, which has 80,000 members, is devoted to the protection of wildlife and the natural environment. An example of Audubon's many activities is the ownership and operation of 40 wildlife refuges. (App. 2-3). The West Michigan Environmental Action Council has a membership of 25 civic organizations and 300 individual members, and is devoted to protecting and restoring the quality of the environment. (App. 3) The Izaak Walton League has a nationwide membership of 50,000. The League has long had a special interest in and an active program to protect aquatic habitats. Because of its concern with the effects of DDT on aquatic organisms, it has participated in state and local proceedings to curb the use of DDT. (Motion To Intervene of Izaak Walton League.)

The Respondents (hereinafter sometimes called "Agriculture") have primary responsibility for the regulation of

pesticides in the public interest. The Secretary of Agriculture has delegated responsibility for the regulation of pesticides to the Pesticides Regulation Division, a branch of the Agriculture Research Service. No pesticides may be sold in interstate commerce unless they are registered with Respondents pursuant to the terms of the Federal Insecticide, Fungicide and Rodenticide Act¹ (hereinafter cited as "FIFRA"). Respondents have authority under that Act to cancel the registration of pesticides causing harm and injury to man, animals and the environment. In case of imminent hazard to the public, Respondents have authority to summarily suspend DDT registrations.

Petition Submitted to Respondents. Petitioners requested by a formal petition filed on October 31, 1969, that Respondents initiate proceedings under Section 4c of FIFRA² to cancel DDT registrations. (App. 1-19) (Such proceedings are initiated by the issuance of notices to registrants, which will hereinafter be referred to as "Section 4c Notices".) Petitioners made their request on the ground that pesticides containing DDT are not in compliance with the standards of FIFRA; in particular that DDT is causing immediate, serious, permanent and irreparable injury to man, the environment, and animals, including fish and wildlife. Petitioners also requested the immediate suspension of DDT registrations under Section 4c for the pendency of cancellation proceedings on the ground that DDT is an "imminent hazard to the public." Suspension is intended to protect the public by removing immediate hazards from the market during lengthy deregistration proceedings (see pp. 24-26, *infra*).

The Petition described in detail the evidence concerning the harm caused by DDT (App. 12-16), citing numerous scientific articles and an Affidavit of Dr. Charles F. Wurster, a professional environmental scientist. (App. 28-32) A submission

¹ 7 U.S.C. § 135 *et seq.*, 61 Stat. 168, as amended.

² 7 U.S.C. § 135b(c), 61 Stat. 168, as amended by 78 Stat. 190.

containing, among other things, a bibliography of 268 articles on DDT prepared by the Environmental Defense Fund accompanied the Petition.

The facts before the Respondents were contained in Petitioners' submissions and three reports of blue ribbon scientific committees appointed by government agencies: (1) Report of November, 1969, of the Commission of the Secretary of Health, Education and Welfare on Pesticides and their Relationship to Environmental Health (hereinafter cited as the Mrak Report),³ which recommended that all uses of DDT⁴ be eliminated except where essential to preserve human health and welfare (App. 34, 41, 43); (2) Report of the President's Science Advisory Committee of May 15, 1963, which called for the elimination of persistent pesticides (App. 40, 43); and (3) Report of May, 1969, of a Committee of the National Research Council, recommending immediate attention to the environmental problems of persistent pesticides. (App. 34, 41, 43) These reports, and, in particular, the Mrak Report, represent major fact-finding efforts

³The Mrak Report's list of Commission members, staff members, advisors and contributors fills 12 pages (Mrak vi-xvii). Dr. Emil Mrak, Chancellor Emeritus of the University of California at Davis, was Chairman of the Committee. The report is 677 pages long. In preparing the report, over 5,000 references to scientific research were reviewed and evaluated (Mrak 5). It is a document on pesticides of unique scope and comprehension.

Because of the importance of the Mrak Report to this cause, Petitioners have lodged five copies with the Clerk. The Department of Health, Education and Welfare, in the case of *Environmental Defense Fund v. Finch*, No. 23812, has also filed with the Court 25 copies of the Mrak Report.

⁴"DDT," sometimes called dichlorodiphenyltrichloroethane, is a mixture of substances which has as its major ingredient chemical compound, 1,1,1-trichloro-2, 2-bis-(*p*-chlorophenyl)ethane. "DDT residues" include DDT; DDE, 1, 1-dichloro-2, 2-bis(*p*-chlorophenyl)ethylene; DDD, also known as TDE, 1,1-dichloro-2, 2-bis-(*p*-chlorophenyl)ethane; and several other closely related chemical compounds derived from DDT by conversion processes within the environment. (App. 3)

on the part of governmental agencies. Facts regarding DDT on all essential points in this cause are dealt with in the Mrak Report. Petitioners will therefore cite specifically the Mrak Report where relevant.

DDT is a pesticide widely used for pest control in a variety of agricultural and non-agricultural situations. It is often used against insects and other pests in connection with tobacco, cotton, shade trees, forest trees, fruit trees, vegetables, and animals. In many cases, the use of DDT is not related to protecting human health or producing food.

One of the most important characteristics of DDT is its persistence in the environment. (App. 28, Mrak 103-104) Unlike many other pesticides, DDT is not broken down to non-toxic compounds by biological processes.

DDT is causing serious, permanent and irreparable harm to man, wildlife resources and to the earth's ecosystem and environment. The harm is of a widespread and immediate nature. (See generally App. 12-16, 28-31, Mrak 206-212) DDT and its residues have characteristics (App. 12-13, 28, Mrak 187) that cause it, when released into the environment, to accumulate in the tissue of non-target organisms (including man) (App. 12-13, 28, Mrak 187, 321-344) and concentrate in food chains. (App. 13, 28, Mrak 187) DDT has been in common use since World War II. (Mrak 45-46) Today more than 100 million pounds of DDT is manufactured and released into the environment each year. (App. 28, Mrak 48) As a result, the entire biosphere has become contaminated with DDT residues. (See generally Mrak 99-176)⁵ DDT and DDT residues are contaminants of human foods, including many foods never treated with DDT (App. 13, 29, Mrak 136-140), and contaminate the tissues of virtually all human beings. (App. 13, 28, Mrak 321-341)

DDT has been proven a cancer-causing agent in test animals in a definitive study supported by the National Cancer

⁵DDT contaminates such diverse elements in the environment as air, rainwater, sea birds, antarctic animals, cosmetics and human milk. (App. 13, 29, Mrak 114, 116, 213)

Institute (App. 15-16, Mrak 470-472, 481-483) confirming earlier evidence. (App. 16, 30-31) The Mrak Report noted:

“ . . . a remarkable degree of concurrence has been found to exist between chemical carcinogenesis in animals and that in man where it has been studied closely.” (Mrak 482)

Another study found human victims of terminal cancer to contain more than twice the concentration of DDT residues in their fat than did victims of accidental death. (App. 16, 30-31, Mrak 495)

DDT is also endangering the reproduction and survival of many non-target organisms. (Mrak 179, 189, 206-212) For example, DDT and DDT residues are a major hazard to bird populations, causing direct death, reproductive failure and, in some species, catastrophic declines approaching extinction. (App. 13-14, 29, Mrak 179, 189, 211-212) DDT likewise is causing direct kills and reproductive failures of fish, threatening important freshwater and marine fisheries. (App. 14, 29, Mrak 209-210) DDT and DDT residues are also causing great damage to useful invertebrates of many species (App. 14-15, 30, Mrak 206-209) and are causing a variety of other ecological and environmental damage. (App. 15, 30, Mrak 189, 206-209)

The tragedy of DDT is compounded by the fact that alternative pest control techniques, particularly integrated techniques, are available for all DDT uses, which would not pose the same threats to the environment and to human health as DDT. (App. 16, Mrak 161-168)

Order of Respondents. On December 11, 1969, Respondents denied Petitioners' request for immediate suspension and substantially denied Petitioners' request to commence cancellation procedures under Section 4c of FIFRA. (App. 34-45)⁶ Respondents took the following actions:

⁶Respondents' order consisted of a letter to Petitioners (App. 34-35) that incorporated by reference two notices: (1) Pesticide Registration Notice 69-17, dated November 20, 1969, initiating procedures to cancel registrations for the sale of DDT for four uses. (App. 40-42)

1. Denied Petitioners' request for immediate suspension of all uses of DDT;

2. Denied Petitioners' request for issuance of Section 4c notices for all economic poisons containing DDT. The Respondents issued a Section 4c notice for four uses of DDT: tobacco, shade trees, household uses, and, with exceptions, aquatic uses. Respondents did not disturb approximately 100 other uses of DDT;

3. Solicited comments concerning the approximately 100 other uses of DDT.

Respondents' determination of December 11, 1969, (App. 34-43) embodies their decision, states their findings and their reasons, and recites the evidence upon which their action was taken. The Mrak Report and the other government reports mentioned above (pp. 5-6) were explicitly relied on. (App. 35, 40-41, 43) Respondents found that the discontinuation of widespread use of DDT was warranted. (App. 41, 43-44) The notices referred to the extensive use of DDT, its persistence and the resulting environmental contamination. (App. 40, 43) It was specifically stated that the Respondents were taking action "to assure greater protection of the environment." (App. 35) The Respondents stated that their determination of December 11, 1969, together with the related action referred to therein, constituted their response to Petitioners' request. (App. 35)

The determination denied the relief sought by Petitioners (except in small part for four uses of DDT). Section 4c notices were not issued for most uses of DDT and no product containing DDT or any use of DDT has been suspended.

This is a Section 4c notice for these four uses which initiates the FIFRA cancellation procedure and is of the type Petitioners sought for all economic poisons containing DDT. Thus, the issuance of this Section 4c notice granted partial relief to Petitioners. (2) Notice published in the Federal Register on November 25, 1969 (34 F.R. 18827) inviting views and comments for a period of 90 days in regard to other uses of DDT. (App. 43-45)

Proceeding in this Court. Petitioners sought review in this Court on December 29, 1969, asking the following relief:

(a) That the order of December 11, 1969, in response to the Petition of October 31, 1969, be set aside;

(b) that the Respondents be ordered to follow statutory procedures, issuing § 4c notices to commence the procedures by which the registrations of all economic poisons that contain DDT could be cancelled; and

(c) that the Respondents be ordered to immediately suspend the registration of all economic poisons that contain DDT during § 4c proceedings.

Because of the urgency of Petitioners' cause, Petitioners moved, on December 29, 1969, that the matter be advanced on the docket and expedited. Respondents moved on January 12, 1970, to dismiss for lack of jurisdiction. Petitioners filed their Opposition thereto on January 22, 1970. On January 29, 1970, this Court, noting "the urgency of petitioners' complaint and the importance of the public safety considerations which it raises," granted Petitioners' Motion to Expedite and ordered that the jurisdictional questions raised by Respondents be deferred for consideration with the merits.

On February 2, 1970, Respondents moved for reconsideration of the Court's January 29 order and announced to the Court that they would not need the period allotted to file a brief and would rest completely on their Motion to Dismiss. (Motion to Reconsider, p. 6) Respondents urged the Court, should it deny the Motion to Reconsider, to set the cause down for oral argument as soon as possible following the filing of Petitioners' brief.

ARGUMENT

I.

RESPONDENTS HAVE ERRED IN DENYING PETITIONERS' REQUEST THAT THEY ISSUE NOTICES UNDER SECTION 4c OF FIFRA TO COMMENCE ADMINISTRATIVE PROCEEDINGS BY WHICH REGISTRATIONS OF ALL ECONOMIC POISONS THAT CONTAIN DDT COULD BE CANCELLED

The Respondents denied Petitioners' request that they issue Section 4c notices for all economic poisons containing DDT. Respondents, however, are required by FIFRA to issue such notices at this time because (a) they have made a finding that widespread DDT use should be discontinued, and (b) because the evidence before them compels a finding that DDT use should be discontinued.

A. The Respondents Must Issue Section 4c Notices Because They Have Made a Finding That Widespread DDT Use Should Be Discontinued

FIFRA was passed in 1947 to protect the public from harmful or ineffective pesticides and other economic poisons, *i.e.*, substances intended for pest or weed control.⁷ The Act was amended in 1964 to better protect the public by closing loopholes which had permitted manufacturers to market unsafe products. The amendment gave Agriculture effective means of refusing, cancelling, and suspending registrations.⁸ Specifically, FIFRA sets out standards and procedures with regard to pesticides to "protect the public"⁹

⁷FIFRA § 2a; 7 U.S.C. § 135(a), 61 Stat. 163 (1947); House Report No. 313, 80th Cong., 1st Sess. (1947); 109 Cong. Rec. 20079 (Statement of Senator Ellender), 88th Cong., 1st Sess. (1963).

⁸See, *e.g.*, Senate Report No. 573 (on S. 1605), 88th Cong., 1st Sess. (1963); House Report No. 1125 (on H.R. 9739), 88th Cong., 2d Sess. (1964); 110 Cong. Rec. 2948-49, 88th Cong., 2d Sess. (1964); 110 Cong. Rec. 7189, 88th Cong., 2nd Sess. (1964); 109 Cong. Rec. 20079, 88th Cong., 1st Sess. (1963).

⁹FIFRA § 2(z)(2), 7 U.S.C. § 135(z)(2)(c), 61 Stat. 166, as amended by 73 Stat. 287.

and “prevent injury to living man and other vertebrate animals, vegetation and useful invertebrate animals.”¹⁰

Economic poisons—including DDT—are required to be registered with the Secretary of Agriculture prior to sale in interstate commerce.¹¹ They cannot, however, be registered unless they are properly labeled. Economic poisons are “misbranded” for these purposes if the label is not adequate, if complied with, to avoid injury to the public and to man, animals, and the environment. If no label can be written which will prevent such injury, an economic poison is inherently misbranded and cannot be registered or sold in interstate commerce.¹²

Upon a preliminary finding that an economic poison is not in compliance with FIFRA, a Section 4c notice is issued to the registrant. The Section 4c notice issued upon such a preliminary finding triggers an administrative procedure which can lead to cancellation. The registrant can, under Section 4c, challenge the Secretary’s preliminary determination through administrative procedures which include a reference to an advisory committee of qualified experts selected by the National Academy of Science and a public hearing before an examiner. At the end of such procedures, the Secretary decides whether or not to cancel the registration.

The issuance of a Section 4c notice is not equivalent to a final determination that registration must be cancelled. Indeed, Congress, in reviewing the administration of FIFRA, stressed that the Secretary of Agriculture should issue a Section 4c notice “*whenever a reasonable question as to*

¹⁰FIFRA § 2(z)(2)(d) and (g), 7 U.S.C. § 135(z)(2)(d) and (g), 61 Stat. 166, as amended by 73 Stat. 287.

¹¹FIFRA § 4(a)-(c), 7 U.S.C. § 135b(a)-(c), 61 Stat. 167-168, as amended.

¹²FIFRA § 135(z)(2)(c) & (d), 7 U.S.C. § 135(z)(2)(c) & (d); see also 7 C.F.R. §§ 362.9, 362.10(k), 362.105(c), 362.105(h), 362.106(f)(4)(v), 362.108(c)(6) and 362.121(g).

the safety of a registered product becomes apparent.” “Deficiencies in Administration of the Federal Insecticide, Fungicide and Rodenticide Act,” House Rept. 91-637, 91st Cong., 1st Sess., Nov. 13, 1969, p. 19 (emphasis in original). In the course of the subsequent administrative proceedings the Secretary of Agriculture has an opportunity to weigh all competing considerations and then make a final determination on cancellation.

It is plain that there is “a reasonable question as to the safety of” DDT. Indeed, the Respondents have found that environmental considerations warrant the discontinuation of widespread use of DDT. The Respondent specifically found (App. 41, 43-44).

“Current information on levels of DDT in the environment warrant the discontinuation of widespread use of DDT when such use is not essential in the production of food or the protection of health.”

Having made a finding that the widespread use of DDT should be discontinued, the Respondents have a duty to issue Section 4c notices for all economic poisons containing DDT.¹³ This is the only way in which the procedure for cancellation of DDT registration can be started.

While calling for general discontinuation of DDT use, Respondents’ finding leaves open the possibility that some uses of DDT might be permitted in unusual circumstances. Such questions are of the type which would properly be considered administratively *after* issuance of Section 4c notices.

There is no rational basis at this stage of the proceedings upon which the Respondents could limit their action to four uses of DDT and leave all other uses unaffected. Respondents’ finding that widespread use of DDT should be discontinued applies with equal force to all DDT uses. One cannot properly make such a sweeping finding and

¹³Section 4c provides that “Whenever the Secretary . . . determines that registration of an economic poison should be cancelled, he shall notify . . . the registrant.” 7 U.S.C. § 135b(c).

then apply it to only four out of 100 DDT uses. DDT's mobility, solubility, and persistence characteristics (App. 12-13, 28, Mrak 187) make it irrelevant as to where it is injected into the ecological system—whether it is sprayed on tobacco or on cotton.

Moreover, there is no justification for Respondents' refusal to issue Section 4c notices for DDT use on such products as cotton, lumber products, woolens, and lawns. Plainly, such uses have nothing to do with human health or food production. Respondents did issue Section 4c notices for four uses, but did not offer any explanation for the selection of these four uses or the exclusion of others.

Instead of issuing Section 4c notices for all uses of DDT, the Respondents have invited "views and comments" on about 100 uses. (App. 43-45) This comment procedure has no basis in FIFRA; it will be duplicated in the proceedings which follow issuance of Section 4c notices; and it adds a wholly unnecessary element of delay to the already protracted administrative procedures under Section 4c.

The invocation of this comment procedure is an example of the Respondents' failure to carry out the policy of FIFRA, which has been exhaustively documented by the Government Operations Committee of the House of Representatives (H.Rept. 91-637, p. 15, *supra*).¹⁴ Among the administrative derelictions catalogued by the Government Operations Committee, the Committee noted:

"The Pesticides Regulation Division did not take prompt or effective cancellation action in cases where it had reason to believe a registered product might be ineffective or potentially hazardous (Emphasis in original)"

¹⁴The procedure is the same as that indulged in by Respondents with regard to certain arsenicals.

"Despite the fact that a contested cancellation proceeding could take many months at best, the subcommittee found that in the case of certain arsenic compounds, USDA resorted to an unnecessary preliminary procedure which took two years before even starting cancellation proceedings." (H.Rept. 91-637 at 50)

“Although PRD has had specific cancellation authority for more than 5 years, it has *never* secured cancellation of a registration in a contested case. (emphasis added)

“The subcommittee investigation disclosed evidence of lengthy and unwarranted delays in initiating cancellation action after facts sufficient to justify such action became known to PRD.”¹⁵

In fact, the Committee reported that Agriculture really took no action at all if a registrant contested a notice:

“Until a few weeks ago, PRD did not even have procedures for conducting hearings or studies which registrants may request as a matter of right before cancellation action can become effective. When registrants receiving cancellation notices requested hearings or studies, prosecution of the cancellation action was halted and the product left on the market.” *Ibid.*

B. Respondents Must Issue Section 4c Notices for Economic Poisons Containing DDT Because the Evidence Before Them Compels a Finding That DDT's Use Should Be Discontinued

As stated above (p. 12), the Respondents have made a finding that widespread DDT use should be discontinued. In addition, the evidence before the Respondents conclusively establishes that DDT is out of compliance with FIFRA standards and compels such a finding. A Section 4c notice must be issued when there is a preliminary finding that a pesticide does not comply with FIFRA and should be discontinued. In like fashion, Section 4c notices must issue where, as in this case, the requisite finding is compelled by evidence.

¹⁵House Report 91-637, *supra* at 15-16.

As long as ten years ago, Justice Douglas noted the widespread effect of DDT on birds, wildlife and human health. He stated that these effects

“... have led to increasing concern in many quarters about the wisdom of the use of this and other insecticides. The alarms that many experts and responsible officials have raised about the perils of DDT underline the public importance in this case.” *Murphy v. Butler*, 362 U.S. 929, 933-934 (1960), dissenting opinion on denial of certiorari.

Scientists have in the intervening years established that DDT is even more damaging than previously believed.

The facts are, as set out by Petitioners' submissions to Agriculture and the Mrak Report (and summarized above, pp. 6-7), that DDT is causing widespread harm and injury to man, animals and environment. (App. 12-16, 28-31, Mrak 179, 189, 206-212) In addition, DDT is a cancer-causing agent (App. 15-16, 30-31, Mrak 470-472, 481-483, 495) that is now a general contaminant of the food and tissue of mankind. (App. 13, 28-29, Mrak 136-140, 321-341). It is clear that DDT does not meet the standards in FIFRA Section 2(z)(2)(c), (d) & (g), which protect the “public” and “man, vertebrate animals, vegetation and useful invertebrate animals” from injury.

Indeed, if Respondents failed to find that DDT does not comply with FIFRA, such failure would constitute an abuse of discretion. Respondents seem to suggest that they have absolute discretion. (Motion to Reconsider, p. 5) The legislative history of Section 4c of FIFRA makes it clear, however, that Respondents have a duty to protect the public from harmful pesticides (see p. 10, *supra*). The facts in this case are such that all the evidence bearing on the relevant factors—carcinogenicity, injury to animals, scope of contamination, persistence—compel a finding of noncompliance with FIFRA standards.

In making the finding that DDT is out of compliance with FIFRA and measuring any discretion of Respondents,

it must be kept in mind that Congress intended Section 4c procedures to be a mechanism for placing the burden of proof on registrants, requiring them to prove to Respondents that economic poisons comply with FIFRA standards. Prior to the 1964 amendments,¹⁶ a manufacturer could demand that his product be registered even if the Secretary of Agriculture objected. If the Secretary wished to attack such a protest registration, he had to file suit and assume the burden of proof in establishing that the product did not conform to FIFRA standards. The 1964 amendments abolished this practice and placed the burden of proving compliance on the registrant:

“The purpose of this bill (H.R. 9739) is to end the practice of protest registration whereby the manufacturer of a pesticide can market a product despite Department of Agriculture doubts as to its effectiveness and safety.

* * *

“The principal effect of registration under protest is to shift the burden of proof from the registrant to the Government. If the product . . . is registered under protest, the Government has the burden of proving that the product does not comply with the Act.

* * *

“The bill will correct this situation and afford greater protection to the public by repealing the authority for registration under protest.”¹⁷

Congresswoman Leonor Sullivan of Missouri stated on February 17, 1964:

“. . . I am strongly in favor of the legislation now before you to require industry, rather than the Federal Government, to shoulder the burden of proof in

¹⁶ Amendments of May 11, 1964, Pub. Law 88-305, 78 Stat. 190.

¹⁷ H. Rept. No. 1125 on H.R. 9739, 88th Cong., 2nd Sess., 64 U.S.C. Cong. & Ad. News 2166-2167.

connection with the marketing of pesticides which may be unsafe for use as intended.

* * *

“We must close any loopholes in the law which permit manufacturers to market products they cannot prove are safe in use in the manner intended. The burden of proof should not rest on the Government, because great damage can be done during the period the Government is developing the data necessary to remove a product which should not be marketed.”¹⁸

Despite the fact, however, that FIFRA places the burden of proving pesticides to be safe on manufacturers, Agriculture does not base its decisions of cancellation on that principle. The government Operations Committee stated:

“A mistaken belief that positive evidence of hazard—rather than simply a lack of adequate assurance of safety—is necessary to support a cancellation action appears to have been a factor in PRD’s failure to initiate such action in cases where it was obviously justified.”¹⁹

The Committee revealed that Agriculture had registered 1,600 products objected to over a five-year period by the Public Health Service because of questions as to their safety. The Committee found that Agriculture was:

“... in effect demanding that HEW supply scientific proof of hazard to support its objections rather than asking the would-be registrant to resolve any doubt

¹⁸110 Cong. Rec. 2948-9, 88th Cong., 2nd Sess., 1964. Also see debate, 110 Cong. Rec. 7189. Congresswoman Sullivan appeared before the Subcommittee of the House Agriculture Committee in support of the legislation. At that time, she was Chairman of the Subcommittee on Consumer Affairs of the House Banking and Currency Committee.

¹⁹House Report 91-637, *supra* at 16.

by providing adequate evidence of the products' safety.'"²⁰

Because of its concern with Respondents' misallocation of the burden of proof and other deficiencies in enforcing FIFRA, the Government Operations Committee urged Respondents to "*...take appropriate steps to insure that cancellation proceedings are promptly initiated whenever a reasonable question as to the safety of a registered product becomes apparent.*"²¹

Petitioners reiterate that the facts in this case are that DDT is substantially out of compliance with FIFRA in that it is causing substantial injury to man, animals and the environment. The evidence in the record of the harm being caused by DDT compels Respondents to make a preliminary finding that DDT should be discontinued, and that Section 4c notices should be issued. In such circumstances the burden is on the registrant to come forward in a Section 4c proceeding and affirmatively prove the safety of their products. A failure to make a finding that DDT use should be discontinued would be an abuse of discretion.²²

²⁰House Report 91-637, *supra* at 14; also see pp. 36-37.

²¹House Report 91-637, *supra* at 19 (emphasis in original).

²²Petitioners note that several state agencies have recently found DDT to be injurious to man, animals and the environment. The Michigan Department of Agriculture cancelled, effective June 27, 1969, Michigan registrations of DDT (with three minor exceptions). Cancellation was based in part on the fact that DDT is injurious to vertebrates in violation of standards in Section 2(z)(2) of the Michigan Economic Poisons Act, 286.162 Mich. Comp. Laws Ann. § 2(z)(1)(2)a-(2)(h), which are parallel to the standards in Section 2(z)(2) of FIFRA.

California has taken action cancelling DDT registrations under provisions designed to protect the environment, man, animals and the public health and safety. See Sections 12824, 14005, Agriculture Code of California (Orders of October 20, 1969 and December 9, 1969, of California Department of Agriculture). Similar action has been taken in Illinois (see Illinois Pesticides Control Law, 5 Ill. Stat.

II

RESPONDENTS HAVE ERRED IN DENYING PETITIONERS' REQUEST THAT THEY SUSPEND DDT REGISTRATIONS IMMEDIATELY AND FOR THE DURATION OF SECTION 4c CANCELLATION PROCEEDINGS

Petitioners requested Agriculture to suspend DDT registrations immediately for the duration of Section 4c proceedings because of the immediacy and widespread nature of the harm it is causing. Respondents have denied Petitioners' request and refused to suspend the registration of any economic poison containing DDT.

The Suspension Clause of Section 4c reads as follows:

“Notwithstanding any other provision of this section, the Secretary may, when he finds that such action is necessary to prevent an imminent hazard to the public, by order, suspend the registration of an economic poison immediately. In such case, he shall give the registrant prompt notice of such action and afford the registrant the opportunity to have the matter submitted to an advisory committee and for an expedited hearing under this section.”

Respondents are compelled by the facts in this case to find that DDT is an imminent hazard to the public. The evidence in the case established that DDT is a cancer-causing agent (App. 15-16, 30-31, Mrak 470-472, 481-483) which is being widely dispersed through the environment. (App. 13, 29, Mrak 99-176), contaminating human food (App. 13, 29, Mrak 136-140) and tissue (App. 13, 28, Mrak 321-341). The evidence also establishes that DDT is causing serious harm to fish and wildlife populations (App. 13, 28, Mrak 179, 189, 206-212), and is bringing some species to the brink of extinc-

Ann. § 87d.5); Florida (see Florida Law of July 9, 1969, Fla. Stat. § 487.042, Rule Section 7E-2-22 of December 17, 1969); Canada (see 114 House of Commons Debates 393, 28th Parliament, 2d Sess., Nov. 3, 1969); and Ontario (see Order-in-Council 3654/69 establishing Regulation 386-69 of September 24, 1969).

tion. The suspension provision is designed to protect the public from such hazards.

Because of the nature and extreme seriousness of the imminent hazard which is established by the facts of record, the Respondents are compelled to suspend DDT registrations.

A. Respondents Are Compelled To Find That DDT Is an Imminent Hazard to the Public

Harm to Wildlife. Justice Douglas noted the concern of experts and officials over the harmful effects of DDT on wildlife ten years ago.²³ That concern has now grown with the ever-increasing evidence that DDT threatens the destruction of whole species.

The evidence submitted by Petitioners to the Respondents, confirmed by the Mrak Report, is that DDT is causing ecological damage across a broad spectrum of life forms. As a result, we are in imminent danger of losing many species which have suffered catastrophic declines. Examples of prominent species which are now threatened are the national bird, the Bald Eagle, and the Peregrin Falcon (Mrak 211-212). Another serious threat is posed to important fresh and salt water fisheries. (App. 14, 29, Mrak 208-210).

The suspension provision was added to FIFRA to protect the public in these circumstances and in others. The legislative history of the suspension provision demonstrates that it was designed to protect fish and wildlife. The 1964 amendments were passed as a result of the concern generated by Rachel Carson's *Silent Spring*.²⁴ The Senate Agriculture Committee indicated that the suspension provisions were intended to encompass protection of fish and wildlife.²⁵

²³*Murphy v. Butler, supra.*

²⁴See statement of Senator Ribicoff, 110 Cong. Rec. 7189; Statement of Congressman Sullivan, 110 Cong. Rec. 2949.

²⁵p. 3, S. Report No. 573, 88th Cong., 1st Sess. (1963).

In addition to their obligations under FIFRA, Respondents were given a special duty to protect wildlife in 1966 under the Endangered Species Act:²⁶

“It is further declared to be the policy of Congress that the Secretary of the Interior, the Secretary of Agriculture, and the Secretary of Defense, together with the heads of bureaus, agencies and services within their departments, shall seek to protect species of native fish and wildlife, including migratory birds that are threatened with extinction.”

The Endangered Species Act calls on Respondents to act with special concern when fish and wildlife species are threatened with extinction. On the record of this case, Respondents are compelled to make the finding that such fish and wildlife species are faced with extinction and, therefore, that DDT is an imminent hazard.

Carcinogenicity. The undisputed evidence in the record of this cause is that DDT is a cancer-causing agent. (App. 15-16, 30-31, Mrak 470-472, 481-483). It is also the undisputed evidence that DDT is now found in virtually all human food and human flesh. (App. 13, 28-29, Mrak 136-140, 321-341).

Congress has, with the passage of the two Delaney Amendments to the Food, Drug and Cosmetic Act, declared as a national policy that cancer-causing agents are unsafe and are to be strictly banned from man's food. The first amendment of the Food Additives Amendment of 1958 provides:

“... No additive shall be deemed to be safe if it is found to induce cancer when ingested by man or animal, or it is found, after tests which are appropriate for the evaluation of safety of food additives, to induce cancer in man or animal.”²⁷

²⁶16 U.S.C. § 668aa *et seq.*, 80 Stat. 926.

²⁷Section 409(c)(3)(A) of the Food, Drug and Cosmetic Act. 21 U.S.C. § 348(c)(3)(A), 72 Stat. 1785. The second Delaney clause was added as § 706(b)(5)(B) to the Food, Drug and Cosmetic Act in 1960

The Delaney Amendments operate to prevent any amount of a food additive or color additive from being added to food if such additive is a cancer-causing agent. This principle of total exclusion which takes away all discretion from officials of the Food and Drug Administration, is based on the fact that scientists have never found a threshold level for cancer-causing agents.

Secretary of Health, Education and Welfare, Arthur S. Flemming, in his testimony concerning the color additives amendment, which was adopted by the House Committee on Interstate and Foreign Commerce,²⁸ said:

“The preponderance of scientific evidence clearly dictates our position: Our advocacy of the anticancer provision in the proposed color additives amendment is based on the simple fact that no one knows how to set a safe tolerance for substances in human foods when those substances are known to cause cancer when added to the diet of animals.

* * *

“Unless and until there is a sound scientific basis for the establishment of tolerances for carcinogens, I believe the Government has a duty to make clear—in law as well as in administrative policy—that it will do everything possible to put persons in a position where they will not unnecessarily be adding residues of carcinogens to their diet.

* * *

“We have no basis for asking Congress to give us discretion to establish a safe tolerance for a substance which definitely has been shown to produce cancer when added to the diet of test animals. We simply have no basis on which such discretion could be exercised because no one can tell us with any assurance at all how to establish a safe dose of any cancer-producing substance.”

and is known as the Color Additives Amendment, 21 U.S.C. § 376 (b)(5)(B), 74 Stat. 399.

²⁸H. Rept. No. 1761, 88th Cong., 2d Sess. (1960).

In *Bell v. Gooddard*, 366 F.2d 177, 181 (7th Cir. 1966), the Seventh Circuit stated:

“The Delaney Clause, 21 U.S.C. § 348(c)(3)(A), provides that no additive ‘shall be deemed to be safe if it is found to induce cancer when ingested by man or animal,’ and is generally intended to prohibit the use of *any* additives which under any conditions induce cancer in *any* strain of test animal.”

The policy of strict ban on cancer agents of the Delaney Amendments was applied to pesticides under the pesticide regulation law²⁹ administered by HEW, which is the companion of FIFRA. In 1959, the Food and Drug Administration seized a large quantity of cranberries sprayed with the agricultural poison, aminotriazole.³⁰ This action was based on scientific evidence that aminotriazole caused cancer. Secretary Flemming based his action on his administrative determination that the Delaney Amendment must be applied to pesticides, even though it was not specifically directed to them.³¹

Even though the Delaney clauses were not enacted as part of FIFRA, they established as policy the principle that carcinogens are to be kept strictly out of food. Even if the Delaney Amendments did not exist, however, it would not change the proposition that carcinogens in man's diet must be considered imminent hazards to the public. The evidence in this case compels the finding that DDT is a carcinogen which now occurs regularly in man's diet.

²⁹ 21 U.S.C. § 346a, 68 Stat. 511. This section is the subject of the companion case before this Court, *Environmental Defense Fund, Inc., et al v. Finch, et al.*, No. 23812. With regard to the discussion of carcinogenicity, see generally Petitioners' Brief in No. 23812.

³⁰ See CCH Food, Drug and Cosmetic Law Reporter, § 59, 109.03.

³¹ See the discussion of the cranberry episode in Brief for Petitioners, *Environmental Defense Fund v. Finch*, No. 23812.

B. Because of the Seriousness and Nature of the Facts Upon Which Respondents Are Compelled to Find DDT is an Imminent Hazard to the Public, They Are Compelled to Suspend DDT Registrations

As we have just shown, the evidence in this case compels findings that DDT is an imminent hazard to the public. Because of the nature and extreme seriousness of the hazards involved, immediate action on the part of Agriculture to suspend DDT registrations is required.

Respondents argue to the contrary (Motion to Reconsider, p. 5, note 4) that suspension is within their absolute discretion because Section 4(c) says "the Secretary *may* [suspend], when he finds that such action is necessary to prevent an imminent hazard to the public. . . ." The word *may*, however, cannot be read to give Petitioners absolute discretion under these circumstances. It would make no sense to give Respondents discretion to ignore their own findings (or findings compelled by evidence before them) that a pesticide is an imminent hazard to the public. The suspension clause was placed in the Act to protect the public from serious injury. Congress did not intend for Respondents to sit idly by while that injury occurs.³²

It is difficult to justify a claim of absolute discretion in light of the fact that the suspension provision was enacted to provide *immediate* relief to the public during Section 4c cancellation proceedings.³³ Congress was concerned because of the substantial delays built into the Section 4c procedure.

An uncontested cancellation is effective thirty days after service of the Section 4c notice. The registrant may, how-

³²"The burden of proof should not rest on the Government, because great damage can be done during the period the Government is developing the data necessary to remove a product which should not be marketed." Congresswoman Sullivan, 110 Cong. Rec. 2949, 88th Cong., 2d Sess., (1964).

³³109 Cong. Rec. 20079, 88th Cong., 1st Sess. (1963).

ever, request the matter be referred to an advisory committee or file objections and request a public hearing. Without going into specifics, which are set out in Section 4c, there are 360 days of built-in delay in these procedures, not including the unspecified time needed to form advisory committees, to prepare for and hold hearings, and to obtain judicial review.

The delays inherent in Section 4c have been compounded by Agriculture's actual practice. For example, in the Section 4c proceedings initiated for the four uses of DDT, the Stouffer Chemical Company requested on December 19, 1969, that the matter be referred to an advisory committee. As of the date of this brief, however, almost two months later, no such advisory committee has been appointed. In addition, while several other manufacturers requested a public hearing with regard to their products on December 19, 1969, no hearing examiner has been appointed. In fact, Respondents have not even filed an answer to the manufacturers' objections which is required by their own rules within 20 days (7 C.F.R. 364.23(a), 34 F.R. 13823 (Aug. 29, 1969)).

Unlawful delay by Agriculture in Section 4c proceedings, the House Government Operations Committee has found, is Agriculture's norm.³⁴

Such delays in cancellation procedures would, perhaps, be tolerable to the public if Respondents suspended poisons in accordance with the obvious Congressional intent. Among the criticisms leveled at Agriculture by the Government Operations Committee, however, was that it failed to take action to remove hazardous products from the market. (H. Rept. 91-637, *supra*, at 8-9, 16, 52-54). In fact, Agriculture has only used its suspension power once, and then to no effect:

"PRD has no procedures or criteria for determining when a registration should be suspended on the ground that a product constitutes an 'imminent

³⁴See p. 13-14, *supra*.

hazard' to the public. Such action has been taken only once; but a product containing an identical ingredient was allowed to remain on the market without even bearing a required warning notice on its label." (House Report, p. 16.)

If the Respondents cannot be made to carry out their duty under FIFRA in a case as blatant as this, the suspension provision will certainly continue in disuse. And, what is worse, the public will have to suffer the havoc of many more millions of pounds of DDT waiting for Agriculture to act.

III

PETITIONERS HAVE STANDING TO OBTAIN REVIEW

Generally speaking, those persons whose interests a statute is designed to protect have standing under that statute to protect those interests. *Hardin v. Kentucky Utilities Co.*, 370 U.S. 1 (1968); *Curran v. Laird*, ___ App. D.C. ___, ___ F.2d (No. 21,040 D.C. Cir., Nov. 12, 1969 (en banc)). When the interest a statute protects is one which is not easily identifiable with any particular group, the courts have granted standing on behalf of the public to those persons who by their activities and conduct exhibit a special interest in the area protected by the statute in question. The two leading decisions on this point are *Office of Communication of the United Church of Christ v. Federal Communications Commission*, 123 App. D.C. 328, 359 F.2d 994 (1966), and *Scenic Hudson Preservation Conference v. Federal Power Commission*, 354 F.2d 608 (2d Cir. 1965).³⁵

³⁵ Also see *Nashville I-40 Steering Committee v. Ellington*, 387 F.2d 179, 182 (6th Cir. 1967); *Norwalk Core v. Norwalk Redevelopment Agency*, 395 F.2d 920 (2nd Cir. 1968); *Road Review League, Town of Bedford v. Boyd*, 270 F. Supp. 650, 660-61 (S.D.N.Y. 1967); *Citizens Committee for the Hudson Valley v. Volpe*, 302 F. Supp. 1083 (S.D.N.Y. 1969); *Powelton Civic Home Owners Ass'n v. Department*

FIFRA is designed to protect the public from pesticide hazards, and, in fact, Congress intended that public groups concerned with those hazards would participate in FIFRA proceedings. Petitioners have shown the special interest in environmental protection to make their participation proper on behalf of the public.

A. FIFRA Contemplates Public Participation in its Proceedings

FIFRA was originally passed to protect the public from harmful pesticides.³⁶ Section 4d was added to FIFRA by the 1964 amendments,³⁷ the purpose of which was to better protect the public from pesticide hazards by closing the protest registration loophole and by tightening generally administrative procedures. (see pp. 15-17, *supra*).³⁸ The House Agriculture Committee Report stated:

of Housing and Urban Development, 284 F. Supp. 809, 821-828 (E. D. Penn. 1968); *Parker v. United States*, ___ F. Supp. ___ (No. C-1368, D.C. Colo., Dec. 24, 1969); *Sierra Club v. Hickel*, ___ F. Supp. ___ (No. 51464, N.D. Calif., July 23, 1969). Three District Courts have upheld the standing of the Sierra Club in environmental suits, including two involving Agriculture. *Parker v. United States*, *supra* +; *Sierra Club v. Hickel*, *supra* +, and *Citizens Committee v. Volpe*, *supra*. (+Copies submitted to Court with Opposition to Motion to Dismiss). Scholarly comment on this subject approves the position taken in these cases. See Berger, *Standing to Sue in Public Actions: Is it a Constitutional Requirement*, 78 Yale L.J. 816 (1969); Rogers, *The Need for Meaningful Control in the Management of Federally Owned Timberlands*, 4 Land & Water L. Rev. 121 (1969); Allen, *The Congressional Intent to Protect Test: A Judicial Lowering of the Standing Barrier*, 41 Colo. L. Rev. 96 (1969); Jaffee, *The Citizen as Litigant in Public Actions: The Non-Hohfeldian or Ideological Plaintiff*, 116 U. Pa. L. Rev. 1033 (1968); Reich, *The Law of the Planned Society*, 75 Yale L.J. 1227 (1966).

³⁶House Report No. 313, 80th Cong., 1st Sess. (1947).

³⁷Act of May 12, 1964, 78 Stat. 190.

³⁸See, e.g., Senate Report No. 573 (on S. 1605), 88th Cong., 1st Sess. (1963); House Report No. 1125 (on H.R. 9739), 88th Cong.,

“The bill will . . . afford protection to the public by repealing the authority for registration under protest.”³⁹

Repealing the protest registration provision had the effect of requiring:

“ . . . industry rather than the Federal Government to shoulder the burden of proof in connection with the marketing of pesticides which may be unsafe for use as intended.”⁴⁰

The fact that FIFRA and its 1964 amendments were designed to protect the public is sufficient to confer standing on those who have a special interest in environmental pollution and health. The language of Section 4d of FIFRA⁴¹ and its legislative history specifically confirm this result.

Section 4d of FIFRA provides judicial review for “*any person* who will be adversely affected.”⁴² An attempt by the National Agricultural Chemical Association to substitute the language, “the applicant for registration, or registrant,” for the term “any person . . . adversely affected,” was rejected. See p. 49, Hearings, *Regulation of Economic Poisons*, August 21 and 22, 1963, Subcommittee on Departmental Oversight and Consumer Relations of the Committee on Agriculture.⁴³

2d Sess. (1964); 110 Cong. Rec. 7189, 88th Cong., 2d Sess. (1964); 109 Cong. Rec. 20079, 88th Cong., 1st Sess. (1963).

³⁹House Report No. 1125 (on H.R. 9739), 88th Cong., 2d Sess., 64 U.S. Code, Cong. & Ad. News 2167.

⁴⁰Leonor K. Sullivan, 110 Cong. Rec. 7189, 88th Cong., 2d Sess. (1964).

⁴¹7 U.S.C. § 135b(d).

⁴²(Emphasis added) In addition, the Administrative Procedure Act, 5 U.S.C. § 702, provides review for anyone “adversely affected or aggrieved by agency action under the meaning of a relevant statute.”

⁴³88th Cong., 1st Sess., Aug. 21-22, 1963.

The colloquy which occurred when the amendment was offered shows conclusively that Congress intended that the proper representatives of the public were intended to have standing:

Parke C. Brinkley (President of the National Agricultural Chemical Association): "It refers to the appeal and lets anybody who wants to do it, whereas this amendment would confine it to the person whose company is actually involved.

* * *

Congressman Hagen: "Your amendment excludes The American Medical Association, for example, from requesting public hearings?

Robert L. Ackerly (counsel with Mr. Brinkley): "Yes; that is true.

Hagen: "It is merely a matter between the Department and the Company?

Ackerly: "That is correct. . . .

Hagen: "But the public, in effect, would be excluded from participating?

Ackerly: "The public would be excluded from participating in this procedure; that is correct.

* * *

Congressman Harvey: "I think it is generally common knowledge that many of the trade-named pesticides have come about as a result of work by the research division of the Department of Agriculture. They have made research findings available to the companies who, in turn, have marketed them under trade names.

"It would seem to me . . . if such a condition is set up in which the Secretary of Agriculture and the Company in question are in this situation, that they would be both on the same side of the issue."
(Hearings, pp. 49-51)

In addition to the legislative history, the language in FIFRA, which provides jurisdiction for "any person . . . adversely affected," is very close to the language involved in *United Church of Christ* and *Scenic Hudson Preservation Conference*.⁴⁴ In those two cases, the Court held that this language conferred standing on organizations representing the public. Petitioners believe this Court's statement on standing in *United Church of Christ* is in fact even more suitable to this case:

"The theory that the Commission can always effectively represent the listener interests in a renewal proceeding without the aid and participation of legitimate listener representatives fulfilling the role of private attorneys general is one of those assumptions we collectively try to work with so long as they are reasonably adequate. When it becomes clear, as it does to us now, that it is no longer a valid assumption which stands up under the realities of actual experience, neither we nor the Commission can continue to rely on it. The gradual expansion and evaluation of concepts of standing in administrative law attests that experience rather than logic or fixed rules has been accepted as the guide. 359 F.2d at 1003-1004.

B. The Petitioners Have Exhibited the Requisite Interest in DDT

The Petitioners have, by their activity and conduct, exhibited the proper interest in the problems involved in this case to represent the public. The Petitioners are four national organizations and one local organization with active programs in the areas of environmental protection and wildlife conservation. Together, Petitioners represent, among their members alone, two hundred thousand concerned citizens. They have shown a strong interest in pesticide problems in general and DDT problems in particular. They have taken various legal and administrative actions dealing

⁴⁴ Also see the cases and authorities cited in note 35, p. 26, *supra*.

with DDT. (App. 1-3, Motion to Intervene of Izaak Walton League)

In *United Church of Christ*, the Church was held to represent the interest of the listening public. In *Scenic Hudson*, conservation groups, including Petitioner Sierra Club, were held to represent the interests of the public in scenic beauty and wildlife conservation. So equally here Petitioners represent the interest of the public in the protection of man, animals and the environment from the hazards of pesticide pollution.

The Respondents contend that environmental protection groups have no place in the decision-making process concerning pesticides. They contend that Department of Agriculture and the pesticide companies should be left to safeguard the nation's environment. Judicial review would be limited to the aggrieved manufacturer if the Respondents ever cancelled a pesticide registration. Petitioners submit that this view of the scheme of pesticide regulation and of the administrative process must be rejected.

IV

THERE IS A FINAL ORDER BEFORE THE COURT FOR REVIEW

Petitioners requested Agriculture to do two things: (1) issue Section 4c notices to begin cancellation proceedings for all economic poisons that contain DDT; (2) suspend all DDT registrations immediately and for the duration of § 4c cancellation proceedings. Agriculture granted partial relief with regard to the Section 4c notices by issuing such a notice for four uses, but denied the relief sought for all other uses. Agriculture denied all relief as to suspension, refusing to suspend DDT or any use thereof.

Respondents' denial of Petitioners' request is embodied in an order of December 11, 1969, which takes the form of a letter. This letter incorporates by reference other documents of which the most important are the Section 4c notice regarding the four uses and the Federal Register

Notice for all other uses. (App. 34-45; see pp. 6-7, *supra*.) These documents together embody Respondents' finding and decision, and refer to the evidence upon which they rely. They deny the relief Petitioners seek. Indeed, Respondents admit (Motion to Reconsider, p. 5, note 4) that they have made a decision not to suspend.

Respondents' order denying the relief sought is a final order which is subject to review by this Court because Petitioners have no further steps they can take in the administrative process. Denial of review will leave Petitioners to await the whim of the Respondents who, in their view, will have no legal obligation to advance the matter to another stage.

The fact that this final order does not come at the end of a Section 4c proceeding is of no consequence. Section 4d of FIFRA provides for review "[in] case of actual controversy as to the validity of any order." The Administrative Procedure Act, 5 U.S.C. 551(b), defines "order" as:

"...the whole or a part of a final disposition, whether affirmative, negative, injunctive, or declaratory in form, of an agency in a matter other than rule-making but including licensing."

Respondents' order makes a final disposition of Petitioners' requests.

In their motion papers, Respondents seem to raise four issues with regard to their order: (1) that the order does not come at the end of a Section 4c proceeding; (2) that the order is not based on a record that would be developed by the end of a Section 4c proceeding; (3) that Section 4c proceedings are underway for four uses; and (4) that the order involves, in part, a letter.

A. Respondents' Order Is a Final Reviewable Order Even Though It Does Not Come at the End of Section 4c Proceedings

The requirement of "finality" is to be interpreted in "a pragmatic way." *Abbott Laboratories v. Gardner*, 387 U.S. 136, 149 (1967). "Whether or not the statutory requirements of finality are satisfied in any given case depends. . . upon a realistic appraisal of the consequences of such action." *Isbrandtsen Co. v. United States*, 93 App. D.C. 293, 211 F.2d 51, 55 (1954). Of key importance is the principle stated in *Cities Service Gas Co. v. F.P.C.*, 255 F.2d 860, 863 (10th Cir. 1956), that:

"An order of an administrative body is reviewable when action taken in advance of hearings or adjudication result in setting legal consequences."⁴⁵

It is of no consequence that an order is issued prior to the end of the proceedings.⁴⁶ Courts of Appeals may review final orders which do not come at the end of formal proceedings, but which determine legal rights at an earlier stage. In *Cities Service Gas Company v. F.P.C.*, *supra*, *Trailways of New England, Inc. v. C.A.B.*, 412 F.2d 926 (1st Cir. 1969), and *Isbrandtsen Co. v. United States*, *supra*, the courts reviewed as a final order the failure of agencies to suspend rate schedules prior to hearing. Also see *Trans-Pacific Freight Conference of Japan v. F.M.B.*, 302 F.2d 875 (D.C. Cir. 1962) (order to a shipping conference to cease collecting fines pending final decision held a final order and was reviewed by the Court of Appeals); *Phillips Petroleum Co. v. F.P.C.*, 227 F.2d 470 (10th Cir. 1955), *cert. denied*, 350 U.S. 1005 (1955) (order maintaining the status quo by suspending a rate schedule pending investigation and hearing reviewed by the Court of Appeals); and *Algonquin Gas Transmission Company v. F.P.C.*, 201 F.2d

⁴⁵ See *Columbia Broadcasting System v. United States*, 316 U.S. 407, 425.

⁴⁶ *Isbrandtsen Co. v. United States*, *supra*, at 55.

334 (1st Cir. 1953) (denial of application for a temporary emergency permit during proceedings reviewed). In the words of the Tenth Circuit:

“The orders sought to be reviewed here do not deal with the merits of the proceedings before the Commission in the sense that they were entered upon evidence concerning the reasonableness of the rates. They do not purport to finally determine Phillips wholesale rates. That matter is left to a conventional hearing in these proceedings. But the orders do purport to establish with finality the wholesale rates which Phillips was authorized to charge Michigan on June 7, 1954 and thereafter until changed by order of the Commission pursuant to hearing.” *Phillips Petroleum Co. v. F.P.C.*, 227 F.2d 470 at 475.

Despite the fact that the order was not the final rate order, the Court of Appeals granted review.

While it does not follow a formal Section 4c proceeding, it is clear that the order denying Petitioners' requests is final except for the four uses.⁴⁷ At the end of Section 4c

⁴⁷Petitioners also note that neither the language of Section 4d of FIFRA nor anything in its legislative history prohibits review of such a final order. In this regard, Section 4d of FIFRA should be read together with the Administrative Procedure Act, under which a right to review must be presumed. *Abbott Laboratories v. Gardner*, 387 U.S. 136 at 140. Section 10b of the APA, 5 U.S.C. § 703, provides that “the form of proceeding for judicial review is the special statutory review proceeding relevant to the subject matter in a court specified by statute or, in the absence or inadequacy thereof, any applicable form of legal action . . . in a court of competent jurisdiction.” Section 4d of FIFRA provides such a special statutory review procedure and is adequate.

The alternative is a bifurcation of review in which some FIFRA final orders are reviewed in the Court of Appeals and others in District Courts. The Supreme Court has rejected this approach in another area. *Foti v. Immigration and Naturalization Service*, 375 U.S. 217 (1963) (also see Jaffe, *Judicial Control of Administrative Action* 422, where bifurcation of review is criticized). The Court noted in *Foti* that the special Court of Appeals review procedure involved was added

proceedings for the four uses, presumably all that can be reviewed is a decision regarding those uses. There is no FIFRA proceeding in progress for cancellation of other DDT uses or suspension of DDT.

B. Respondents' Order Is a Final Reviewable Order Even Though It Is Not Based on a Record Developed During a Section 4c Proceeding

Since a final order need not necessarily come at the end of a formal administrative proceeding, it follows that it need not necessarily be based on a record developed during such proceeding. In fact, the cases cited above on finality (p. 33, *supra*) all involved situations where there was no record developed from a formal hearing. (See the quote from Phillips Petroleum at p. 34, *supra*.) There will obviously never be the kind of record in this cause which Respondents insist is needed for review if review is not available now. Indeed, there are no proceedings underway that would create such a record.

In the case of suspension, it is difficult to conceive of the kind of record Respondents insist on. Suspension is designed as a remedy which is operative while such a record is being made. After such a record is made and acted on, the time for suspension is past.

In fact, of course, there is an adequate record (pp. 4-6, 7-8, *supra*). It consists of the Petition, the related submissions, the Mrak Report and Respondents' Order. (App. 1-45). Nothing additional is needed for review of the decision and order before the Court. The evidence which was before Respondents was sufficient to compel the determination

to the Immigration and Nationality Act because of Congressional dissatisfaction with the legal delays in deportation cases, 375 U.S. at 225, 84 S. Ct. at 312. This echoes the situation with regard to the 1964 amendments to FIFRA which were added because of Congressional dissatisfaction with the Court's difficulties in getting hazardous pesticides off the market (see pp. 15-18, 24, *supra*).

and findings that DDT is causing harm to man, animals and the environment and that it is an imminent hazard to the public.⁴⁸

C. The Fact That Respondents Have Initiated Section 4c Proceedings For Only Four Uses of DDT Supports Petitioners' Contention That There Is a Final Order

As discussed earlier, Agriculture has issued Section 4c notices for four uses—but only four uses. This means, of course, that the Section 4c proceedings in progress only relate to the four uses and will result in a decision that only affects those four uses. Conversely, it means there are not proceedings underway for all other uses. Petitioners are not seeking review at this time of the cancellation of the four uses, but only of the decision not to issue Section 4c notices and inaugurate administrative proceedings for other uses and of the decision not to suspend any use at all.

Agriculture's statement in their Motion to Reconsider (p. 2, note 2) that administrative procedures are underway, citing the procedure for the four uses, is perhaps intended to suggest that this cause is not ripe for review. The main purposes of the ripeness doctrine is to prevent the courts from making decisions in the abstract, and more importantly, to protect agencies from interference while they are in the middle of proceedings. *Abbott Laboratories v. Gardner, supra*, at 148-49. However, in this case, except for the

⁴⁸If, however, the Court believes the record is deficient, we note that Section 4d provides in part:

"If application is made to the court for leave to adduce additional evidence, the court may order such additional evidence to be taken before the Secretary, and to be adduced upon the hearing in such manner and upon such terms and conditions as to the court may seem proper, if such evidence is material and there were reasonable grounds for failure to adduce such evidence in the proceedings below."

This provision obviously gives the Court all the authority it needs to deal with any deficiency.

four uses, there are no FIFRA proceedings with which the Court can interfere and Petitioners bring before the court a concrete problem for which there are specific remedies. The denial of the request for suspension and the request to issue Section 4c notices for all other uses of DDT is ripe for review.

**D. The Fact That Respondents' Order Was In
Part In Letter Form Is Irrelevant to Final
Order Question**

The fact that Respondents' order was in part in letter form is irrelevant to the final order question. The form of an order or its label does not determine whether it is an order. *Isbrandtsen v. United States*, *supra*, at 55. A telegram, *Phillips Petroleum Co. v. F.P.C.*, *supra*, at 474, or a letter, *United States v. Bass*, 215 F.2d 9 (8th Cir. 1954), can serve as an order, even if the Court finds it "obscure" and "ambiguous." *Schenley Industries, Inc. v. Fowler*, 275 F. Supp. 356 (D.C. D.C. 1967).

CONCLUSION

For all the reasons stated herein, Petitioners respectfully request that this Court grant the following relief:

- (a) that the Order of December 11, 1969, in response to the Petition of October 31, 1969, be set aside;
- (b) that the Respondents be ordered to follow statutory procedures, issuing Section 4c notices to commence the procedures by which the registrations of all economic poisons that contain DDT could be cancelled; and

(c) that the Respondents be ordered to immediately suspend the registrations of all economic poisons that contain DDT during Section 4c proceedings.

Respectfully submitted,

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ADDENDUM

[219]

SECTIONS 2-4, FEDERAL INSECTICIDE, FUN-
GIDE, AND RODENTICIDE ACT; 7 U.S.C.
SECS. 135-135b, 64 STAT 163 AS AMENDED

DEFINITIONS

Sec. 2. For the purposes of this Act—

a. The term “economic poison” means (1) any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects, rodents, nematodes, fungi, weeds, and other forms of plant or animal life or viruses, except viruses on or in living man or other animals, which the Secretary shall declare to be a pest, and (2) any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant.

b. The term “device” means any instrument or contrivance intended for trapping, destroying, repelling, or mitigating insects or rodents or destroying, repelling, or mitigating fungi, nematodes, or such other pests as may be designated by the Secretary, but not including equipment used for the application of economic poisons when sold separately therefrom.

c. The term “insecticide” means any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any insects which may be present in any environment whatsoever.

d. The term “fungicide” means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any fungi.

e. The term “rodenticide” means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating rodents or any other vertebrate animal which the Secretary shall declare to be a pest.

2 Add.

f. The term "herbicide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any weed.

g. The term "nematocide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating nematodes.

h. The term "plant regulator" means any substance or mixture of substances, intended through physiological action, for accelerating or retarding the rate of growth or rate of maturation, or for otherwise altering the behavior of ornamental or crop plants or the produce thereof, but shall not include substances to the extent that they are intended as plant nutrients, trace elements, nutritional chemicals, plant inoculants, and soil amendments.

i. The term "defoliant" means any substance or mixture of substances intended for causing the leaves or foliage to drop from a plant, with or without causing abscission.

j. The term "desiccant" means any substance or mixture of substances intended for artificially accelerating the drying of plant tissue.

k. The term "nematode" means invertebrate animals of the phylum nemathelminthes and class nematoda, that is, unsegmented round worms with elongated, fusiform, or sac-like bodies covered with cuticle, and inhabiting soil, water, plant or plant parts; may also be called nemas or eelworms.

l. The term "weed" means any plant which grows where not wanted.

m. The term "insect" means any of the numerous small invertebrate animals generally having the body more or less obviously segmented, for the most part, belonging to the class insecta, comprising six-legged, usually winged forms, as, for example, beetles, bugs, bees, flies, and to other allied classes of arthropods whose members are wingless and usually have more than six legs, as, for example, spiders, mites, ticks, centipedes, and wood lice.

3 Add.

n. The term “fungi” means all non-chlorophyll-bearing thallophytes (that is, all non-chlorophyll-bearing plants of a lower order than mosses and liverworts), as, for example, rusts, smuts, mildews, molds, yeasts, and bacteria, except those on or in living man or other animals.

o. The term “ingredient statement” means either—

(1) a statement of the name and percentage of each active ingredient, together with the total percentage of the inert ingredients, in the economic poison; or

(2) a statement of the name of each active ingredient, together with the name of each and total percentage of the inert ingredients, if any there be, in the economic poison (except option 1 shall apply if the preparation is highly toxic to man, determined as provided in section 6 of this Act); and, in addition to (1) or (2) in case the economic arsenic in any form, a statement of the percentages of total and water soluble arsenic, each calculated as elemental arsenic.

p. The term “active ingredient” means—

(1) in the case of an economic poison other than a plant regulator, defoliant or desiccant, an ingredient which will prevent, destroy, repel, or mitigate insects, nematodes, fungi, rodents, weeds, or other pests;

(2) in the case of a plant regulator, an ingredient which, through physiological action, will accelerate or retard the rate of growth or rate of maturation or otherwise alter the behavior of ornamental or crop plants or the produce thereof;

(3) in the case of a defoliant, an ingredient which will cause the leaves or foliage to drop from a plant;

(4) in the case of a desiccant, an ingredient which will artificially accelerate the drying of plant tissue.

q. The term “inert ingredient” means an ingredient which is not active.

r. The term “antidote” means a practical immediate treatment in case of poisoning and includes first-aid treatment.

4 Add.

s. The term “person” means any individual, partnership, association, corporation or any organized group of persons whether incorporated or not.

t. The term “Territory” means any Territory or possession of the United States, excluding the Canal Zone.

u. The term “Secretary” means the Secretary of Agriculture.

v. The term “registrant” means the person registering any economic poison pursuant to the provisions of this Act.

w. The term “label” means the written, printed, or graphic matter on, or attached to, the economic poison or device or the immediate container thereof, and the outside container or wrapper of the retail package, if any there be, of the economic poison or device.

x. The term “labeling” means all labels and other written, printed, or graphic matter—

(1) upon the economic poison or device or any of its containers or wrappers;

(2) accompanying the economic poison or device at any time;

(3) to which reference is made on the label or in literature accompanying the economic poison or device, except to current official publications of the United States Department of Agriculture and Interior, the United States Public Health Service, State experiment stations, State agricultural colleges, and other similar Federal or State institutions or agencies authorized by law to conduct research in the field of economic poisons.

y. The term “adulterated” shall apply to any economic poison if its strength or purity falls below the professed standard of quality as expressed on its labeling or under which it is sold, or if any substance has been substituted wholly or in part for the article, or if any valuable constituent of the article has been wholly or in part abstracted.

z. The term “misbranded” shall apply—

5 Add. :

(1) to any economic poison or device if its labeling bears any statement, design, or graphic representation relative thereto or to its ingredients which is false or misleading in any particular;

(2) to any economic poison—

(a) if it is an imitation of or is offered for sale under the name of another economic poison;

(b) if its labeling bears any reference to registration under this Act other than the registration number assigned to the economic poison;

(c) if the labeling accompanying it does not contain directions for use which are necessary and if complied with adequate for the protection of the public;

(d) if the label does not contain a warning or caution statement which may be necessary and if complied with adequate to prevent injury to living man and other vertebrate animals, vegetation, and useful invertebrate animals;

(e) if the label does not bear an ingredient statement on that part of the immediate container and on the outside container or wrapper, if there be one, through which the ingredient statement on the immediate container cannot be clearly read, of the retail package which is presented or displayed under customary conditions of purchase: Provided, That the Secretary may permit the ingredient statement to appear prominently on some other part of the container, if the size or form of the container makes it impracticable to place it on the part of the retail package which is presented or displayed under customary conditions of purchase;

(f) if any word, statement, or other information required by or under authority of this Act to appear on the label or labeling is not prominently placed thereon with such conspicuousness (as compared with other words, statements, designs, or graphic matter in the labeling) and in such terms as to render it likely to be read and understood by the ordinary individual under customary conditions of purchase and use;

6 Add.

(g) if in the case of an insecticide, nematocide, fungicide, or herbicide when used as directed or in accordance with commonly recognized practice it shall be injurious to living man or other vertebrate animals, or vegetation, except weeds, to which it is applied, or to the person applying such economic poison; or

(h) if in the case of a plant regulator, defoliant, or desiccant when used as directed it shall be injurious to living man or other vertebrate animals, or vegetation to which it is applied, or to the person applying such economic poison: Provided, That physical or physiological effects on plants or parts thereof shall not be deemed to be injury, when this is the purpose for which the plant regulator, defoliant, or desiccant was applied, in accordance with the label claims and recommendations.

PROHIBITED ACTS

Sec. 3.a. It shall be unlawful for any person to distribute, sell, or offer for sale in any Territory or in the District of Columbia, or to ship or deliver for shipment from any State, Territory, or the District of Columbia, to any other State, Territory, or the District of Columbia, or to any foreign country, or to receive in any State, Territory, or the District of Columbia from any other State, Territory, or the District of Columbia, or foreign country, and having so received, deliver or offer to deliver in the original unbroken package to any other person, any of the following:

(1) Any economic poison which is not registered pursuant to the provisions of section 4 of this Act, or any economic poison if any of the claims made for it or any of the directions for its use differ in substance from the representations made in connection with its registration, or if the composition of an economic poison differs from its composition as represented in connection with its registration: Provided, That in the discretion of the Secretary, a change in the labeling or formula of an economic poison may be

7 Add.

made within a registration period without requiring reregistration of the product.

(2) Any economic poison unless it is in the registrant's or the manufacturer's unbroken immediate container, and there is affixed to such container, and to the outside container or wrapper of the retail package, if there be one, through which the required information on the immediate container cannot be clearly read, a label bearing—

(a) the name and address of the manufacturer, registrant, or person for whom manufactured;

(b) the name, brand, or trade-mark under which said article is sold;

(c) the net weight or measure of the content: Provided, That the Secretary may permit reasonable variations; and

(d) when required by regulation of the Secretary to effectuate the purposes of this Act, the registration number assigned to the article under this Act.

(3) Any economic poison which contains any substance or substances in quantities highly toxic to man, determined as provided in section 6 of this Act, unless the label shall bear, in addition to any other matter required by this Act—

(a) the skull and crossbones;

(b) the word "poison" prominently (IN RED) on a background of distinctly contrasting color; and

(c) a statement of an antidote for the economic poison.

(4) The economic poisons commonly known as standard lead arsenate, basic lead arsenate, calcium arsenate, magnesium arsenate, zinc arsenate, zinc arsenite, sodium fluoride, sodium fluosilicate, and barium fluosilicate unless they have been distinctly colored or discolored as provided by regulations issued in accordance with this Act, or any other white powder economic poison which the Secretary, after investigation of and after public hearing on the necessity for such action for the protection of the public health and the feasibility of such coloration or

8 Add.

discoloration, shall, by regulation, require to be distinctly colored or discolored, unless it has been so colored or discolored: Provided, That the Secretary may exempt any economic poison to the extent that it is intended for a particular use or uses from the coloring or discoloring required or authorized by this section if he determines that such coloring or discoloring for such use or uses is not necessary for the protection of the public health.

(5) Any economic poison which is adulterated or misbranded or any device which is misbranded.

b. Notwithstanding any other provision of this Act, no article shall be deemed in violation of this Act when intended solely for export to any foreign country and prepared or packed according to the specifications or directions of the foreign purchaser.

c. It shall be unlawful—

(1) for any person to detach, alter, deface, or destroy, in whole or in part, any label or labeling provided for in this Act or the rules and regulations promulgated hereunder, or to add any substance to, or take any substance from, an economic poison in a manner that may defeat the purpose of this Act;

(2) for any manufacturer, distributor, dealer, carrier, or other person to refuse, upon a request in writing specifying the nature or kind of economic poison or device to which such request relates, to furnish to or permit any person designated by the Secretary to have access to and to copy such records as authorized by section 5 of this Act;

(3) for any person to give a guaranty or undertaking provided for in section 7 which is false in any particular, except that a person who receives and relies upon a guaranty authorized under section 7 may give a guaranty to the same effect, which guaranty shall contain in addition to his own name and address the name and address of the person residing in the United States from whom he received the guaranty or undertaking; and

9 Add.

(4) for any person to use for his own advantage or to reveal, other than to the Secretary, or officials or employees of the United States Department of Agriculture or other Federal agencies, or to the courts in response to a subpoena, or to physicians, and in emergencies to pharmacists and and other qualified persons, for use in the preparation of antidotes, in accordance with such directions as the Secretary may prescribe, any information relative to formulas of products acquired by authority of section 4 of this Act.

REGISTRATION

Sec. 4.a. Every economic poison which is distributed, sold, or offered for sale in any Territory or the District of Columbia, or which is shipped or delivered for shipment from any State, Territory, or the District of Columbia to any other State, Territory, or the District of Columbia, or which is received from any foreign country shall be registered with the Secretary: Provided, That products which have the same formula, are manufactured by the same person, the labeling of which contains the same claims, and the labels of which bear a designation identifying the product as the same economic poison may be registered as a single economic poison; and additional names and labels shall be added by supplement statements; the applicant for registration shall file with the Secretary a statement including—

(1) the name and address of the registrant and the name and address of the person whose name will appear on the label, if other than the registrant;

(2) the name of the economic poison;

(3) a complete copy of the labeling accompanying the economic poison and a statement of all claims to be made for it, including the directions for use; and

(4) if requested by the Secretary, a full description of the tests made and the results thereof upon which the claims are based

10 Add.

b. The Secretary, whenever he deems it necessary for the effective administration of this Act, may require the submission of the complete formula of the economic poison. If it appears to the Secretary that the composition of the articles is such as to warrant the proposed claims for it and if the article and its labeling and other material required to be submitted comply with the requirements of section 3 of this Act, he shall register it.

c. If it does not appear to the Secretary that the article is such as to warrant the proposed claims for it or if the article and its labeling and other material required to be submitted do not comply with the provisions of this Act, he shall notify the applicant for registration of the manner in which the article, labeling or other material required to be submitted fail to comply with the Act so as to afford the applicant for registration an opportunity to make the corrections necessary. If, upon receipt of such notice, the applicant for registration does not make the corrections, the Secretary shall refuse to register the article. The Secretary, in accordance with the procedures specified herein, may suspend or cancel the registration of an economic poison whenever it does not appear that the article or its labeling or other material required to be submitted complies with the provisions of this Act. Whenever, the Secretary refuses registration of an economic poison or determines that registration of an economic poison should be cancelled, he shall notify the applicant for registration or the registrant of his action and the reasons therefor. Whenever an application for registration is refused, the applicant, within thirty days after service of notice of such refusal, may file a petition requesting that the matter be referred to an advisory committee or file objections and request a public hearing in accordance with this section. A cancellation of registration shall be effective thirty days after service of the foregoing notice unless within such time the registrant (1) makes the necessary corrections; (2) files a petition requesting that the matter be referred to an advisory committee; or (3)

11 Add.

files objections and requests a public hearing. Each advisory committee shall be composed of experts, qualified in the subject matter and of adequately diversified professional background selected by the National Academy of Sciences and shall include one or more representatives from land-grant colleges. The size of the committee shall be determined by the Secretary. Members of an advisory committee shall receive as compensation for their services a reasonable per diem, which the Secretary shall by rules and regulations prescribe, for time actually spent in the work of the committee, and shall in addition be reimbursed for their necessary traveling and subsistence expenses while so serving away from their places of residence, all of which costs may be assessed against the petitioner, unless the committee shall recommend in favor of the petitioner or unless the matter was referred to the advisory committee by the Secretary. The members shall not be subject to any other provisions of law regarding the appointment and compensation of employees of the United States. The Secretary shall furnish the committee with adequate clerical and other assistance, and shall by rules and regulations prescribe the procedures to be followed by the committee. The Secretary shall forthwith submit to such committee the application for registration of the article and all relevant data before him. The petitioner, as well as representatives of the United States Department of Agriculture, shall have the right to consult with the advisory committee. As soon as practicable after any such submission, but not later than sixty days thereafter, unless extended by the Secretary for an additional sixty days, the committee shall, after independent study of the data submitted by the Secretary and all other pertinent information available to it, submit a report and recommendation to the Secretary as to the registration of the article, together with all underlying data and a statement of the reasons or basis for the recommendations. After due consideration of the views of the committee and all other data before him, the Secretary shall, within ninety days after receipt of the report and recommendations of the advisory

committee, make his determination and issue an order, with findings of fact, with respect

to registration of the article and notify the applicant for registration or registrant. The applicant for registration, or registrant, may, within sixty days from the date of the order of the Secretary, file objections thereto and request a public hearing thereon. In the event a hearing is requested, the Secretary shall, after due notice, hold such public hearing for the purpose of receiving evidence relevant and material to the issues raised by such objections. Any report, recommendations underlying data, and reasons certified to the Secretary by an advisory committee shall be made a part of the record of the hearing, if relevant and material, subject to the provisions of section 7(c) of the Administrative Procedure Act (5 U.S.C. 1006(c)). The National Academy of Sciences shall designate a member of the advisory committee to appear and testify at any such hearing with respect to the report and recommendations of such committee upon request of the Secretary, the petitioner, or the officer conducting the hearing: *Provided*, That this shall not preclude any other member of the advisory committee from appearing and testifying at such hearing. As soon as practicable after completion of the hearing, but not later than ninety days, the Secretary shall evaluate the data and reports before him, act upon such objections and issue an order granting, denying, or cancelling the registration or requiring modification of the claims or the labeling. Such order shall be based only on substantial evidence of record of such hearing, including any report, recommendations, underlying data, and reason certified to the Secretary by an advisory committee, and shall set forth detailed findings of fact upon which the order is based. In connection with consideration of any registration or application for registration under this section, the Secretary may consult with any other Federal agency or with an advisory committee appointed as herein provided. Notwithstanding the provisions of section 3.c.(4), information relative to formulas of products ac-

quired by authority of this section may be revealed, when necessary under this section, to an advisory committee, or to any Federal agency consulted, or at a public hearing, or in findings of fact issued by the Secretary. All data submitted to an advisory committee

in support of a petition under this section shall be considered confidential by such advisory committee: *Provided*, That this provision shall not be construed as prohibiting the use of such data by the committee in connection with consultation with the petitioner or representatives of the United States Department of Agriculture, as provided for herein, and in connection with its report and recommendations to the Secretary. Notwithstanding any other provision of this section, the Secretary may, when he finds that such action is necessary to prevent an imminent hazard to the public, by order, suspend the registration of an economic poison immediately. In such case, he shall give the registrant prompt notice of such action and afford the registrant the opportunity to have the matter submitted to an advisory committee and for an expedited hearing under this section. Final order of the Secretary under this section shall be subject to judicial review, in accordance with the provisions of subsection d. In no event shall registration of an article be construed as a defense for the commission of any offense prohibited under section 3 of this Act.

d. In a case of actual controversy as to the validity of any order under this section, any person who will be adversely affected by such order may obtain judicial review by filing in the United States court of appeals for the circuit wherein such person resides or has his principal place of business, or in the United States Court of Appeals for the District of Columbia Circuit, within sixty days after the entry of such order, a petition praying that the order be set aside in whole or in part. A copy of the petition shall be forthwith transmitted by the clerk of the court to the Secretary, or any officer designated by him for that purpose, and thereupon the Secretary shall file in the court the record of the proceedings on which he based his order, as pro-

vided in section 2112 of title 28, United States Code. Upon the filing of such petition the court shall have exclusive jurisdiction to affirm or set aside the order complained of in whole or in part. The findings of the Secretary with respect to questions of fact shall be sustained if supported by substantial evidence when

considered on the record as a whole, including any report and recommendation of an advisory committee. If application is made to the court for leave to adduce additional evidence, the court may order such additional evidence to be taken before the Secretary, and to be adduced upon the hearing in such manner and upon such terms and conditions as to the court may seem proper, if such evidence is material and there were reasonable grounds for failure to adduce such evidence in the proceedings below. The Secretary may modify his findings as to the facts and order by reason of the additional evidence so taken, and shall file with the court such modified findings and order. The judgment of the court affirming or setting aside, in whole or in part, any order under this section shall be final, subject to review by the Supreme Court of the United States upon certiorari or certification as provided in section 1254 of title 18 of the United States Code. The commencement of proceedings under this section shall not, unless specifically ordered by the court to the contrary, operate as a stay of an order. The court shall advance on the docket and expedite the disposition of all causes filed therein pursuant to this section.

e. Notwithstanding any other provisions of this Act, registration is not required in the case of an economic poison shipped from one plant to another plant operated by the same person and used solely at such plant as a constituent part to make an economic poison which is registered under this Act.

f. The Secretary is authorized to cancel the registration of any economic poison at the end of a period of five years following the registration of such economic poison or at the

15 Add.

end of any five-year period thereafter, unless the registrant, prior to the expiration of each such five-year period, requests in accordance with regulations issued by the Secretary that such registration be continued in effect.

1 App.

Before the
UNITED STATES DEPARTMENT OF AGRICULTURE

Environmental Defense Fund.
Incorporated,
Sierra Club,
West Michigan Environmental
Action Council, and
National Audubon Society.
Petitioners

TO: Honorable Clifford M. Hardin,
Secretary of Agriculture

**PETITION REQUESTING THE SUSPENSION AND
CANCELLATION OF REGISTRATION OF
ECONOMIC POISONS CONTAINING DDT**

Petitioners request the Secretary of Agriculture to exercise his authority under the Federal Insecticide, Fungicide, and Rodenticide Act, 61 Stat. 163, as amended, 7 U.S.C. §§ 135-135k, to take immediate action to ban the use of DDT. Scientific evidence which has been accumulating at an accelerating rate clearly establishes that DDT is causing irreparable damage to the environment, and present scientific information establishes that DDT is a cancer-causing agent. Many other jurisdictions, in this country and abroad, have banned or severely restricted the uses of DDT. The Federal Government, charged with responsibility for protecting the health and welfare of its citizens and the protection of the nation's natural resources, must take appropriate action to stop the use of DDT. The Department of Agriculture has the power to suspend the registration of DDT and economic poisons containing DDT. The Department should exercise that authority at once.

I. PETITIONERS

[2] Petitioner Environmental Defense Fund, Incorporated (hereinafter "EDF"), is a non-profit, tax-exempt membership corporation organized under the laws of the State of New York. EDF is made up of scientists and other citizens

2 App.

dedicated to the protection of man's environment, employing legal action where necessary. EDF has, through litigation, sought to protect the environment from various forms of pollution. Its Scientists Advisory Committee, with more than 200 members, including some of the world's foremost environmental scientists, assures that positions taken are thoroughly supported by scientific evidence. An extensive bibliography on DDT has been compiled by EDF. The articles on DDT which are cited in this petition are listed in Appendix A, attached hereto.¹ In its activities, EDF does not concern itself with the pecuniary interests of individuals; rather, it seeks to assure the preservation or restoration of environmental quality on behalf of the general public.

Petitioner Sierra Club is a non-profit membership corporation organized under the laws of the State of California with membership of 80,000. The Sierra Club has been in existence since 1892. Among its stated purposes is the preservation of scenic resources, forests, waters, wildlife and wilderness. In furtherance of its purposes, the Sierra Club engages in many educational activities, including an extensive publishing program and wilderness [3] outing program. In addition, the Sierra Club has participated in several legal actions to preserve the environment and maintains staff offices and membership chapters in all regions of the country.

Petitioner National Audubon Society (hereinafter "Audubon") is a non-profit membership corporation organized under the laws of the State of New York. Audubon has as its purposes the protection of wildlife and the natural environment, and the education of man regarding his relationship with and his place within the natural environment as an ecological system. Audubon has over 80,000 members and a history of 65 years devoted to these pur-

¹Also attached to the copy of the petition filed with the Secretary is a copy of the entire EDF bibliography, with reprints of the articles which are of special relevance.

3 App.

poses. Audubon owns and operates 40 wildlife refuges, five nature interpretation centers and three adult ecological summer camps, and maintains a lecture program that reaches 200 cities annually. Audubon supports important research on endangered species and publishes papers on ecological research.

Petitioner West Michigan Environmental Action Council (hereinafter "the Environmental Action Council") is an unincorporated association. Its membership consists of 25 civic organizations and 300 individual members, primarily in West Michigan. Among the Environmental Action Council's stated purposes is assisting and coordinating the efforts of individuals and organizations to protect and restore the quality of the environment and to take necessary and appropriate action in furtherance thereof, including the dissemination of information through newsletters, lectures, seminars, participation in official hearings, and preparing and promoting model legislation.

[4] II. DEFINITIONS

"DDT," sometimes called dichlorodiphenyltrichloroethane, is a mixture of substances which has as its major ingredient the chemical compound 1,1,1-trichloro-2,2-bis-(*p*-chlorophenyl)ethane. DDT is widely used, in a variety of economic poisons, as a pesticide.

"DDT residues" include DDT; DDE, 1,1-dichloro-2,2-bis (*p*-chlorophenyl)ethylene; DDD, also known as TDE, 1, 1-dichloro-2, 2-bis (*p*-chlorophenyl)ethane; and several other closely related chemical compounds derived from DDT by conversion processes within the environment.

III. OTHER RELEVANT PROCEEDINGS

A. Petition to the Secretary of Health, Education and Welfare Requesting Repeal of Tolerances for DDT

On October 7, 1969, a petition was filed by six individuals and EDF with the Secretary of Health, Education and Welfare requesting the repeal of the tolerances for DDT on raw agricultural commodities. The petition, a copy of which is attached hereto as Appendix B, was based upon evidence that DDT is a carcinogenic or cancer-causing agent. (See, *infra*, pp.16-17.) Five of the individual petitioners therein are nursing mothers or are expecting to give birth in the very near future. The petition has not been acted upon as of this date.

On this day, said six individuals and EDF have requested the Secretary of Health, Education and Welfare immediately to repeal the existing tolerances for DDT on raw agricultural commodities and to set such tolerances at zero. In addition, Secretary Finch has been requested [5] to take all further steps to protect the health and welfare of the nation by banning the use of DDT on the ground that it is a carcinogen or cancer-causing agent. A copy of this petition was attached to the request addressed to the Secretary of Health, Education and Welfare. A copy of the request to the Secretary of Health, Education and Welfare is attached to this petition as Appendix C.

B. Requests for Information on DDT from the Department of Agriculture

The Petitioners have made diligent efforts to obtain from the Department of Agriculture documents relating to the registration of DDT and economic poisons containing DDT, and information in the Department's files relating to damage to the environment and to living man caused by DDT and such economic poisons.

5 App.

On September 18, 1969, a request for access to such information was made by Petitioner Environmental Action Council. On October 14, 1969, Petitioner Environmental Action Council renewed its request of September 18, 1969, and sought some related information. On October 24, 1969, Petitioners EDF and Sierra Club joined in the above request of Petitioner Environmental Action Council.

As of this date, the Department of Agriculture has failed to respond to any of these requests and has failed to give Petitioners Environmental Action Council, EDF, or Sierra Club access to any records of the Department of Agriculture. As a result, petitioners are unable to identify with particularity those economic poisons containing DDT that have been registered by the Department of Agriculture. As a further result, petitioners have been unable to determine the extent to which the matters presented herein have been considered by the Department of Agriculture.

[6] C. Recent Actions by Administrative Agencies
Against Carcinogenic Substances and Other
Substances Posing Substantial Risks to Public
Health

1. *Cyclamates*

A recent precedent was set by Secretary of Health, Education and Welfare Robert Finch for immediate administrative action to protect the public where there is evidence that a substance on the market and in common use has carcinogenic qualities. On October 18, 1969, the Secretary acted to remove cyclamates from the market only five days after learning of scientific evidence of their carcinogenicity. His action was based on "recent experiments conducted on laboratory animals which disclosed the presence of malignant bladder tumors after these animals had been subjected to strong dosage levels of cyclamates for long periods." See statements of Secretary Robert H. Finch and Jesse L. Steinfeld, Deputy Assistant Secretary for Health and Scientific Affairs, October 18, 1969, attached hereto as Appendix D.

6 App.

Secretary Finch emphasized "in the strongest possible terms that we have no evidence at this point that cyclamates have indeed caused cancer in humans." However, he stated that he felt it "imperative to follow a prudent course in all matters concerning public health." Appendix D, Statement of Secretary Finch, p. 1.

Deputy Assistant Secretary Steinfeld added:

"We can in no way at this time extrapolate the new data from rat experiments to human beings. Nevertheless, we in this Department—whether from a legal or from a scientific point of view—cannot afford to ignore any possibility of the rat data being applicable to the human population. As long as this possibility exists, a prudent concern for the health of the public [7] dictates that precautionary action be taken." Appendix D, Statement of Deputy Assistant Secretary Steinfeld, p. 6.²

2. *The Herbicide 2,4,5-T*

Dr. Lee A. DuBridge announced this week that the Federal Government will shortly initiate a coordinated series of actions to restrict the use of the herbicide 2,4,5-T. Among other actions, he stated that the Department of Agriculture would cancel the registration of the herbicide for use on food crops unless a basis can be found for establishing a safe legal tolerance before January 1, 1970. Office of Science and Technology, Executive Office of the President, Press Release, October 29, 1969.

²In an action in 1959, Secretary of Health, Education and Welfare Flemming made it clear that the strong policy against permitting cancer-causing agents in the market applies to pesticides as well as other products. By administrative interpretation, he ordered the seizure of all cranberries found to have residues of the pesticide aminotriazole, which had been found to cause cancer in mice. See CCH, Food, Drug and Cosmetic Law Rptr., 54,109.03. See *Bell v. Goddard*, 366 F.2d 177, 181 (7th Cir. 1966) (use of food additive barred where it caused cancer in animals notwithstanding small quantities ingested by man).

The Department of Agriculture's cancellation of the registration was based on a finding that the herbicide caused deformities in rats and mice. The data relied upon did not establish that the herbicide would have deleterious effects in man. The measure was explained as having a prophylactic purpose: to "assure safety of the public while further evidence is being sought."³

D. Actions in Other Jurisdictions

The Michigan Agriculture Commission cancelled, effective June 27, 1969, the registrations of DDT except for control of bats, mice and head lice. Cancellation was based [8] on the facts that DDT is injurious to vertebrates and that there are safer alternative modes of pest control; thus DDT violated § 2z(2)(g) of the Michigan Economic Poisons Act. 12 Mich. Stat. Ann. § 352(2)(z)(2)(g). This standard is substantially identical to a parallel provision of the Federal Insecticide, Fungicide and Rodenticide Act. 61 Stat. 163, as amended, 7 U.S.C. §§ 135-135k (hereinafter "FIFRA").

On October 29, 1969, the Director of the California Department of Agriculture issued a regulation cancelling the registration of DDT for use in that State on 47 field crops.

On March 27, 1969, Sweden announced a moratorium on the use of DDT and several other chlorinated hydrocarbons.

In Canada, several of the provinces have taken action to ban DDT. Ontario, by Order-in-Council 3654-69, issued on September 24, 1969, banned all uses of DDT, effective January 1, 1970, with limited exceptions. Several other provinces have taken action regarding DDT or announced that action is impending. The Federal Government in Ottawa will shortly adopt stringent measures limiting the use of DDT.

³It was also reported that research evidence showed that the herbicide increased the incidence of cancer. *Los Angeles Times*, October 30, 1969, part I, p. 11.

IV. APPLICABLE LAW: FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT

A. Economic Poisons

The Secretary of Agriculture regulates economic poisons under FIFRA. "Economic poisons," as defined in FIFRA § 2a, 7 U.S.C. § 135(a), include the various mixtures which have DDT as their active ingredient and appear on the market under trade names.

[9] B. Registration Requirements

Section 4a of FIFRA, 7 U.S.C. § 135b(a), requires that:

"[E]very economic poison . . . which is shipped or delivered for shipment from any State, Territory or the District of Columbia to any other State, Territory or the District of Columbia, or which is received from any foreign country shall be registered with the Secretary [of Agriculture]."

C. Suspension of Imminent Hazards

Under § 4c of FIFRA, 7 U.S.C. § 135b(c), the Secretary of Agriculture has the duty to suspend by order the registration of an economic poison "when he finds that such action is necessary to prevent an imminent hazard to the public." See also 7 C.F.R. § 364.4(c), published at 34 Fed. Reg. 13822.

Either the fact that an economic poison is a cancer-causing agent or the fact that it is destructive of fish, wildlife and useful animals would be sufficient in itself to qualify it as an "imminent hazard to the public."

1. *Carcinogenicity*

Proof that an economic poison is a carcinogen is a prime example of the kind of showing which establishes that it poses "an imminent hazard." The rapid response of HEW in banning cyclamates and the announced actions against

the herbicide 2,4,5-T by the Department of Health, Education and Welfare and the Department of Agriculture (see pp.6-7 *supra*) confirm the Federal policy of banning cancer-producing agents by immediate action.

Congress has evinced special concern about carcinogenic or cancer-causing agents, declaring in the Food Additives Amendment to the Federal Food, Drug, and Cosmetics Act, 21 U.S.C. § 348(c)(3)(a):

[10] “[N]o additive shall be deemed to be safe if it is found to induce cancer when ingested by man or animal, or it is found, after tests which are appropriate for the evaluation of the safety of food additives, to induce cancer in man or animal . . .”

In 1960, Congress passed the Color Additives Amendments to that Act and included a similar anticancer clause. 21 U.S.C. § 376(b)(5)(B).

Arthur S. Flemming, the Secretary of Health, Education and Welfare at the time of the passage of the Color Additive Amendments, summarized the philosophy embodied in the anticancer provisions in testimony before the House Committee on Interstate and Foreign Commerce:

“The preponderance of scientific evidence clearly dictates our position: Our advocacy of the anti-cancer proviso in the proposed color additives amendment is based on the simple fact that *no one knows how to set a safe tolerance for substances in human foods when those substances are known to cause cancer when added to the diet of animals.* I should like to underline again one statement in particular which I read earlier from the summary of Dr. [G. Burroughs] Mider’s review of the role of certain chemical and physical agents in relation to cancer. It is this:

“‘No one at this time can tell how much or how little of a carcinogen would be required to produce cancer in any human being, or how long it would take the cancer to develop.’

“This is why we have no hesitancy in advocating the inclusion of the anticancer clause.

“Unless and until there is a sound scientific basis for the establishment of tolerances for carcinogens, I believe the Government has a duty to make clear—in law as well as in administrative policy—that it will do everything possible to put persons in a position where they will not unnecessarily be adding residues of carcinogens to their diet.” (See House Rpt. No. 1761, June 7, 1960, 2 U.S.C. Cong. & Admin. News, 86th Cong., 2d Sess., 2887 (1960)) (Emphasis supplied)

2. Damage to Fish, Wildlife and Useful Animals

Congress intended to include the hazard of destruction of fish, wildlife and useful animals as an “imminent [11] hazard.” The “imminent hazard” provision was added by the 1964 amendments to FIFRA (78 Stat. 190). The Senate Committee Report, in discussing the imminent hazard concept, stated that damage to fish and wildlife should be given due consideration. See Senate Report No. 57 on S. 1605, 88th Cong., 1st Sess. (1963).

D. Cancellation of Economic Poisons Not in Compliance with FIFRA

In addition to immediate suspension of an economic poison as an imminent hazard, the Secretary of Agriculture has the duty to issue a notice of cancellation of the registration of an economic poison when it appears that the economic poison, its labeling, or other material do not comply with the provisions of FIFRA. FIFRA § 4c, 7 U.S.C. § 135b(c). Any economic poison which is “misbranded,” as the term is defined, FIFRA § 2z(2), 7 U.S.C. § 135(2)(z)(2), is not in compliance with the Act. The Section 2z(2) definition of “misbranded” products states, in relevant part:

“The term ‘misbranded’ shall apply . . . (2) to any economic poison . . . (c) if the labeling accompanying it does not contain directions for use which

are necessary and if complied with adequate for the protection of the public; (d) if the label does not contain a warning or caution statement which may be necessary and if complied with adequate to prevent injury to living man and other vertebrate animals, vegetation, and useful invertebrate animals . . . (g) if in the case of an insecticide, nematocide, fungicide, or herbicide when used as directed or in accordance with commonly recognized practice, it shall be injurious to living man or other vertebrate animals, or vegetation, except weeds to which it is applied, or to the person applying such economic poison; . . .”

An economic poison is necessarily “misbranded” when it cannot be used in a manner which protects the public and prevents injury to man and animals. Where that is the case, a notice of cancellation should be issued.

[12] The regulations of the Department of Agriculture reflect the above standards in several provisions. See, *e.g.*, 7 C.F.R. §§ 362.6, 362.9, 362.10 (k), 362.105 (c), 362.105(h) 362.106 (f)(4)(v), 362.108 (c) (6), 362.121 (g).

E. Burden of Proof

The suspension and cancellation procedures of § 4c of FIFRA, discussed above, were added to FIFRA by amendment in 1964 (78 Stat. 190).

The purpose of the 1964 amendment was to give the Secretary full authority to remove hazardous and unlawful economic poisons from the market and to shift the burden of proving their safety to the registrant. House Report No. 1125 on H.R. 9739, 88th Cong., 2d Sess., 64 U.S.C. Cong. & Admin. News, 2166-2167.

V. THE DAMAGE CAUSED BY DDT TO MAN AND THE ENVIRONMENT

The Secretary must take account of the weight of scientific evidence which establishes that the continued use of DDT is inconsistent with the scheme of FIFRA. The Act presupposes that no economic poison will be registered, or where already registered that such registration will be suspended by the Secretary, if the economic poison poses an imminent hazard to the public or if it is injurious to man, animals or the environment. The hazards of DDT are now well documented and require immediate action.

In this section petitioners will describe the damage which DDT has caused to the environment and the threats it poses to human health. Because of the technical character of the issue and the numerous citations to scientific materials, petitioners have attached to this petition a list of leading [13] authorities. The numbered references in this section correspond to numbers in the list of authorities. See Appendix A.

The Affidavit of Charles F. Wurster, attached to this petition as Appendix E, also provides support for the propositions set out in this section. Dr. Wurster, the Chairman of the Scientists Advisory Committee of petitioner EDF, is a leading environmental scientist.

DDT, a pesticide which has been in common use since World War II, performed a useful function at a time when alternative pesticides were unavailable. Alternative pesticides and procedures that are of equal effectiveness but cause less damage are now available. (267, Appendix E, ¶ 17). The time has come for the Federal Government to act against the use of DDT. Because it is an imminent hazard to the environment and to human health, such action should be taken immediately.

DDT combines in a single molecule the properties of broad biological activity, chemical stability, mobility, and solubility, characteristics (139) that cause it to be accumu-

lated by living non-target organisms, thus presenting dangers that are unusual among major pollutants (268). DDT not only enters food chains from the inorganic environment, it is increasingly concentrated toward the top of food chains, thereby posing a particular threat to carnivores (90, 155, 156, 161, 208, 209, 214, 260).

Because DDT residues are mobile (4, 20, 21, 22, 41, 157, 181, 201), chemically stable (60, 137, 201), nearly insoluble in water (20) but quite soluble in lipid or fat-like materials (139), DDT cannot be used and released in the environment under any circumstances, whether or not in accord with any label or directions, without the eventual contamination [14] of food chains (86, 90, 106, 131, 155, 156, 161, 208, 209, 214, 252, 260), including human foods, and the tissues of non-target organisms, including man (50, 149, 223, 258).

The entire biosphere has, in fact, become contaminated with DDT residues, including such seemingly unlikely places as air (1, 2, 9, 157), rainwater (181, 205), birds living hundreds of miles at sea (155, 214), Arctic and Antarctic animals (71, 174, 182, 220, 225), and cosmetics, and human milk (148, 221). DDT residues are regular contaminants of human foods, including many foods never treated with the material, and contaminate the tissues of virtually all human beings (50, 149, 223, 258).

DDT residues retain their broad biological activity long enough to be hazardous to contaminated non-target organisms, most of which are far removed by both time and space from the original site of the DDT application. (Appendix E, ¶7).

The relationships between DDT residues and hazards to bird populations, by both direct mortality and reproductive failure, have been particularly well documented. DDT causes carnivorous birds, including birds of prey, sea birds, and many other species, to lay eggs with abnormally thin shells (88, 150, 211, 233). These eggs break prematurely, resulting in sharply reduced reproductive success (105).

Populations of these species have in many cases undergone catastrophic declines, in some cases approaching extinction (7, 87, 154, 214). The decline in eggshell thickness occurred shortly after the large scale introduction of DDT into the world environment in the late 1940's (88, 150). Controlled feeding experiments with DDT and its metabolites have established the causal relationship between DDT residues [15] in the environment, the production of eggs with abnormally thin shells, and greatly reduced reproductive success (218, 232, 256).

DDT causes direct mortality of large numbers of birds. This has been especially true where attempts were made to control Dutch elm disease with DDT, but has also occurred under many other circumstances (89, 191, 213, 236).

DDT inhibits reproduction in fish, with abnormal mortality of the fry following the contamination of the adult fish and their eggs. This has occurred in several freshwater situations, with mortalities of 100 percent of the fry in some instances (28, 47, 235). Controlled experiments confirmed that DDT residues were the causative agents (244, 245). Many fish from other areas, including commercially important fish from marine waters, show concentrations of DDT residues in their tissues that approach those that caused this abnormal fry mortality (8, 156, 224, 241). Important freshwater and marine fisheries are seriously threatened by present and anticipated future concentrations of DDT residues in the tissues of the fish. DDT also causes the direct mortality of large numbers of fish, a phenomenon that has occurred under a variety of circumstances (46, 62, 198).

DDT residues do great damage to useful invertebrates of many species. Insect communities are frequently disrupted by the killing of beneficial predatory and parasitic insects, thereby frequently aggravating the insect pest problem DDT was intended to control (100, 267). It kills pollinating insects. It damages various crustaceans such as crabs and shrimp (77, 117, 168, 253). Even the base of oceanic food chains, the phytoplankton, can have their photosynthetic

15 App.

activity reduced by a few parts per billion of DDT in the water (215).

[16] By eliminating certain organisms, especially carnivorous organisms, from biotic communities, DDT residues are causing widespread ecological damage (208). Such ecosystem simplification contributes to population explosions of certain organisms lower in the food chain and normally controlled by the carnivores. Proliferation of herbivorous insect pests or herbivorous birds like blackbirds are examples of this phenomenon (267). The stability of ecosystems is thereby reduced by the disruptions caused by DDT.

DDT and its residues cause these serious environmental effects by virtue of the great variety of their biological activity within living systems. These residues are nerve toxins (49, 217), induce hydroxylating enzymes in the liver (42, 112, 145, 229), inhibit certain other enzymes, and interfere with the photosynthetic process (215). They also are known to induce estrogenic activity (17, 264).

DDT residues exhibit this broad range of biological activity within a great diversity of animals and even some plant species; their activity extends to all five classes of vertebrates—amphibians, reptiles, fish, birds, and mammals. With these non-target organisms serving as warning signals or monitors, showing the great and diverse biological activity of DDT within a broad range of animals, it is hardly surprising that DDT has now been shown to operate by yet another biological mechanism—it is a carcinogenic or cancer-causing agent. (Appendix E, ¶12.)

In a definitive study supported by the National Cancer Institute, DDT was added to the diet of mice and compared with both positive and negative [17] control groups of mice (238). The frequency of tumors of the liver, lungs and lymphoid organs was four times greater in mice fed DDT than those in the negative control group. The carcinogenicity was clearly established because DDT caused cancer of the same kind and at approximately the same frequency as did known cancer-causing agents (the positive controls) (238).

The National Cancer Institute study confirmed earlier evidence indicating the carcinogenicity of DDT. As early as 1947, a study by the Food and Drug Administration showed that when DDT was fed to rats there was an increased incidence of liver tumors (226). Similar results were obtained using rainbow trout, where DDT in the food of the fish caused the formation of hepatomas (231). Other experiments with mice carried through five generations showed that the DDT mice had a substantially higher incidence of leukemia and of tumors than the non-DDT mice (262).

In studies done at the University of Miami School of Medicine, human victims of terminal cancer were found to contain more than twice the concentration of DDT residues in their fat as did victims of accidental death (223, 258). The accident victims carried 9.7 parts per million in their fat, about average for Americans, while the cancer victims contained 20 to 25 parts per million.

Evidence that DDT causes cancer in human beings is not conclusive, but DDT is clearly carcinogenic in test animals. The evidence on DDT is similar to the evidence of the carcinogenic activity of the cyclamates. The Secretary of Health, Education and Welfare promptly withdrew cyclamates from the market on the basis of such evidence. The Secretary of Agriculture should do no less with DDT.

Alternative integrated control techniques, including the use of chemical, biological, and other pest management [18] procedures are available that are as effective as DDT (37, 65, 251, 267). Alternative techniques would not cause the injury to the environment nor pose the threat to human health described above if substituted for all of DDT's uses. (Appendix E, ¶17). DDT is a highly disruptive material in the environment and causes outbreaks of mites, aphids, and scale insects by killing their natural enemies (267). It has been stated by a leading authority in the field that DDT has no place in an integrated pest control system (267).

VI. CONCLUSIONS

The overwhelming scientific evidence establishes that DDT is a cancer-causing agent, is injurious to animal, bird and fish populations, and is causing serious ecological damage. For these reasons, the continued use of DDT poses an imminent hazard to the public, threatening human health and environmental resources. Petitioners have long been concerned with the interrelationship of a wholesome environment and human welfare. Further introduction of DDT into the environment is entirely inconsistent with the values which the Secretary of Agriculture is bound to preserve.

Specifically, petitioners have shown that DDT does not comply with the Federal Insecticide, Fungicide, and Rodenticide Act in the following respects:

(1) DDT is an imminent hazard to the public under section 4c of FIFRA, 7 U.S.C. § 135b(c), and the registration statements of all economic poisons containing DDT should be immediately suspended.

(2) DDT does not comply with the provisions of section 2z(2)(d) of FIFRA, 7 U.S.C. § 135(2)(z)(2)(d) since it is causing serious, permanent and irreparable injury to [19] entire populations of non-target vertebrate and useful invertebrate animals. No warning or caution statement contained in any label is or would be adequate if complied with to prevent this injury. The injury is occurring under the commonly recognized practices for the use of DDT.

(3) DDT does not comply with Section 2z(2)(c) of FIFRA, 7 U.S.C. § 135(2)(z)(2)(c), for the reasons that it is causing serious, permanent and irreparable damage to the public in that it is causing injury specified above in the preceding paragraph and that it (a) is causing serious, permanent and irreparable damage to the fish and wildlife resources of the United States; (b) is causing serious, permanent and irreparable ecological damage; (c) is a carcinogen, and (d) is causing serious, permanent and irreparable

18 App.

damage to large numbers of diverse non-target organisms essential or beneficial to the public. No directions contained in any written material would be adequate if complied with to prevent said damage. The damage is occurring under the commonly recognized practices for the use of DDT.

(4) DDT does not comply with Section 2(z)(2)(g) of FIFRA, 7 U.S.C. § 135(2)(z)(2)(g), since when used as directed or used in accordance with commonly recognized practice it is injurious to living man and other vertebrate animals to which it is applied and to persons applying such economic poison.

(5) Alternative integrated control techniques, including the use of chemical, biological, and other pest management procedures are available that are substantially as effective as DDT and that do not presently cause the injury and harm set forth above and would not cause such harm if substituted for substantially all of DDT's uses.

[20] VII. PRAYER FOR RELIEF

Petitioners request that the Secretary:

By order, immediately, (1) suspend the registration of all economic poisons that contain DDT; and (2) issue Notices of Cancellation for all registered economic poisons that contain DDT, affording petitioners an opportunity to participate fully in any administrative proceedings held follow-

19 App.

ing the issuance of notices of cancellation including the right to adduce evidence, to rebut and to cross-examine.

Respectfully submitted.

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October 31, 1969

20 App.

Appendix A to Petition Requesting the Suspension
and Cancellation of Registration of Economic
Poisons Containing DDT

LIST OF AUTHORITIES

Reference numbers cited in Section V of this petition correspond to the numbers in the more extensive Bibliography, one copy of which was submitted to Secretary Hardin, entitled "A Bibliography on the Effects of DDT on Non-Target Organisms."

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Appendix E to Petition Requesting the Suspension
and Cancellation of Registration of Economic
Poisons Containing DDT

AFFIDAVIT

The undersigned, Charles F. Wurster, being duly sworn, deposes and says:

1. I presently reside at Oldfield, New York, My address is Department of Biological Sciences, State University of New York, Stony Brook, New York 11790.

2. I am a professional environmental scientist. My professional credentials, background and bibliography are attached to this Affidavit as Appendix A. [Not reprinted in this Appendix]

3. Whenever I use the term DDT herein I mean the mixture of substances commonly known as DDT, which stands for dichlorodiphenyltrichloroethane, and which has as its major ingredient the chemical compound 1,1,1-trichloro-2,2-bis(*p*-chlorophenyl)ethane. Whenever I use the term "DDT residues," I mean DDT as defined above, and DDE, 1,1-dichloro-2,2-bis(*p*-chlorophenyl) ethylene, and several other closely related chemical compounds derived from DDT by conversion processes within the environment.

4. DDT is a broad-spectrum, persistent chemical biocide with an extremely low water solubility, and a high solubility in lipids. Because of these properties and a variety of mechanisms that transport DDT, it leaves its original site of application, eventually contaminating the food chains and tissues of non-target organisms.

5. More than 100,000,000 pounds of DDT is manufactured and released into the environment each year. It is applied in a wide variety of pest control situations by many different techniques. Because DDT residues are mobile, chemically stable, slightly soluble in water, and quite soluble in lipid or fat-like materials, DDT cannot be used and released in the environment [2] under any circumstances, whether or not in accord with any label or directions, without the eventual contamination of food chains, includ-

ing human foods, and the tissues of non-target organisms, including man.

6. The entire biosphere has, in fact, become contaminated with DDT residues, including such seemingly unlikely places as air, rainwater, birds living hundreds of miles at sea, Arctic and Antarctic animals, cosmetics, and human milk. DDT residues are regular contaminants of human foods, including many foods never treated with the material, and they contaminate the tissues of essentially all human beings.

7. DDT residues retain their broad biological activity long enough to be hazardous to contaminated non-target organisms, most of which are far removed by both time and space from the original site of the DDT application.

8. DDT has long been known to be an extremely serious environmental hazard, although the extremity of the situation has become more obviously apparent in recent years. DDT causes carnivorous birds, including birds of prey, sea birds, and many other species, to lay eggs with abnormally thin shells. These eggs break prematurely, resulting in sharply reduced reproductive success. Populations of these species have in many cases undergone catastrophic declines, in some cases approaching extinction itself. Controlled experiments confirm that DDT residues were the causative agents. DDT also directly kills large numbers of birds.

9. DDT also inhibits reproduction in fish, with abnormal mortality of the fry following the contamination of the adult fish and their eggs. This has occurred in several freshwater situations, with mortalities of 100 percent of the fry in some [3] instances. Controlled experiments confirmed that DDT residues were the causative agents. Many fish from other areas, including commercially important fish from marine waters, show concentrations of DDT residues in their tissues that approach those that caused this abnormal fry mortality. I conclude that important freshwater and marine fisheries are seriously threatened by present and anticipated future concentrations of DDT residues in the tissues of the fish. DDT also directly kills large numbers of fish.

10. DDT residues do great damage to useful invertebrates of many species. Insect communities are frequently disrupted by the killing of beneficial predatory and parasitic insects, thereby frequently aggravating the insect pest problem DDT was intended to control. It kills pollinating insects. It also damages various crustaceans such as crabs and shrimp. Even the base of oceanic food chains, the phytoplankton, can have their photosynthetic activity reduced by a few parts per billion of DDT in the water.

11. By eliminating certain organisms, especially carnivorous organisms, from biotic communities, DDT residues are causing widespread ecological damage. Such ecosystem simplification contributes to population explosions of certain organisms lower in the food chain and normally controlled by the carnivores. Outbreaks of herbivorous insect pests or herbivorous birds like blackbirds are examples of this phenomenon. The stability of ecosystems is thereby reduced by the disruptions caused by DDT.

12. DDT and its residues cause these serious environmental effects by virtue of the great breadth of their biological activity within living systems. These residues are known to be estrogenic, to be inducers of hydroxylating enzymes in the [4] liver, to be inhibitors of certain other enzymes, and to interfere with the photosynthetic process. DDT residues exhibit this broad range of biological activity within a great diversity of animals, and even some plant species; their activity extends to all five classes of vertebrates—amphibians, reptiles, fish, birds, and mammals. With these non-target organisms serving as warning signals or monitors—with great and diverse biological activity occurring within a broad range of animals—it is hardly surprising that DDT has now been shown to operate by yet another mechanism—it is a carcinogenic or cancer-causing agent.

13. DDT causes cancer in test animals. While we do not have conclusive evidence that DDT causes cancer in human beings, DDT must be labelled carcinogenic.

31 App.

14. In studies done at the University of Miami School of Medicine, human victims of terminal cancer were found to contain more than twice as much DDT residues in their fat as did victims of accidental death. The accident victims carried 9.7 parts per million, which is about average for Americans, while the cancer victims contained 20-25 parts per million in their fat.

CONCLUSIONS

15. DDT is causing serious, permanent and irreparable injury to entire populations of non-target vertebrate and useful invertebrate animals. No warning or caution statement contained in any label would be adequate if complied with to prevent said injury. Said injury is occurring under the commonly recognized practices for the use of DDT.

16. DDT is causing serious, permanent and irreparable damage to the public in that it is causing the injury specified above and that it (a) is causing serious, permanent and irreparable damage to the fish and wildlife resources of the United [5] States; (b) is causing serious, permanent and irreparable ecological damage; (c) is a carcinogenic or cancer-causing agent; and (d) is causing serious, permanent and irreparable damage to large numbers of diverse non-target organisms essential or beneficial to the public. No directions contained in any written material would be adequate if complied with to prevent said damage. Said damage is occurring under the commonly recognized practices for the use of DDT.

17. Alternative integrated control techniques, including the use of chemical, biological, and other pest management procedures are available that are substantially as effective as DDT that do not presently cause the injury and harm set forth above and would not cause said harm if substituted for substantially all of DDT's uses.

18. My above-stated opinions are based upon my knowledge of the research of many scientists as communicated

32 App.

personally and by publication in recognized scientific journals, and, in part, upon my own research investigations.

For all the reasons set forth herein, DDT is an imminent hazard to the public and its use should be immediately suspended.

/s/ Charles F. Wurster

Subscribed and sworn to before me this 28th day of October, 1969.

/s/ Dorothy M. Kern
Notary Public

My Commission Expires: 1/14/74

DEPARTMENT OF AGRICULTURE
Office of the Secretary
Washington, D. C. 20250

November 10, 1969

Mr. James W. Moorman
Center for Law and Social Policy
1752 Swann Street, N.W.
Washington, D. C. 20009

Dear Mr. Moorman:

This is in reply to your letter of October 31 enclosing a copy of "Petition Requesting the Suspension and Cancellation of Registration of Economic Poisons Containing DDT."

The Petition, along with the supporting documents, has been referred to the appropriate agency within the Department for consideration.

Sincerely,

/s/ Ned D. Bayley
Director of Science & Education

DEPARTMENT OF AGRICULTURE

Office of the Secretary
Washington, D. C. 20250

December 11, 1969

Mr. James W. Moorman
Center for Law and Social Policy
1752 Swann Street, N.W.
Washington, D. C. 20009

Dear Mr. Moorman:

This is in further reply to your letter of October 31, 1969, submitting a petition requesting the suspension and cancellation of registration of economic poisons containing DDT, filed on behalf of Environmental Defense Fund, Inc., Sierra Club, West Michigan Environmental Action Council and the National Audubon Society. This will also reply to your letter of November 7, 1969.

We have been concerned for some time over the potential hazards that may result from the presence of DDT and other persistent pesticides in the environment. It was because of our concern for the environment that the Department requested the National Academy of Sciences-National Research Council to study and provide a factual report on the effects of persistent pesticides on man, agriculture, and the environment. Their report has been completed, and, in general, it pointed to adequate protection to man's food and health under the present systems of controls, but recommended expanded research leading to the development of new pesticidal chemicals and techniques for using them, and the strengthening of the regulation and monitoring of persistent pesticides to provide long-range protection for wildlife and the overall environment.

In April 1969, Secretary Finch of the Department of Health, Education, and Welfare appointed a Commission to

35 App.

study pesticides and their relationship to environmental health. Recently Secretary Finch released the Commission's conclusions and its recommendations for actions to be taken.

As a result of the above two reports and other considerations that we have been reviewing, we have taken a number of steps to assure greater protection to the environment.

On October 23, 1969, the Department of Agriculture issued a policy on pesticides. A copy is enclosed for your information.

[2] On November 13, 1969, a directive was issued that listed special environmental considerations that must be applied to the registration of pesticides. The details were announced in the Press Release USDA 3508-69 of which a copy is enclosed for your additional information.

On November 20, 1969, our Pesticides Regulation Division began mailing a Notice to Manufacturers, Formulators, Distributors, and Registrants of Economic Poisons notifying them of the cancellation of registration of DDT products for certain uses. A copy of this PR Notice 69-17 is enclosed for your information.

In the November 25, 1969 (Vol. 34, No. 226), issue of the Federal Register was published a notice of action being taken to cancel the registration of the DDT uses in the aforementioned notice. Also, it served notice that the Department is considering cancellation of any other uses of DDT and affords interested persons an opportunity for a period of 90 days to submit their views and comments. A copy of the Federal Register publication is enclosed for your additional information.

We believe that these actions are responsive to your petition when reviewed in the light of the two studies by eminent scientists and other essential considerations.

Sincerely,

/s/ Ned D. Bayley

Director of Science & Education

4 Enclosures

UNITED STATES DEPARTMENT OF AGRICULTURE

Office of the Secretary
Washington, D. C. 20250

October 23, 1969

SECRETARY'S MEMORANDUM NO. 1666

U.S.D.A. Policy on Pesticides

It is the policy of the Department of Agriculture to practice and encourage the use of those means of effective pest control which provide the least potential hazard to man, his animals, wildlife, and the other components of the natural environment.

For the foreseeable future, pesticides will be necessary tools for the protection of the nation's food and fiber supplies, people, and their homes.

Where chemicals are required for pest control, patterns of use, methods of application and formulations which will most effectively limit the impact of the chemicals to the target organisms shall be used and recommended. In the use of these chemicals, the Department has a continuing concern for human health and well-being and for the protection of fish and wildlife, soil, air, and water from pesticide contamination.

In keeping with this concern, persistent pesticides will not be used in Department pest control programs when an effective, nonresidual method of control is available. When persistent pesticides are necessary to combat pests, they will be used in minimal effective amounts, applied precisely to the infested area, and at minimal effective frequencies.

Nonchemical methods of pest control, biological or cultural, will be used and recommended whenever such methods are available for the effective control or elimination of target pests. Integrated control systems utilizing

37 App.

both chemical and nonchemical techniques will be used and recommended in the interest of maximum effectiveness and safety.

[2] In carrying out its responsibilities, the Department will continue to:

- Conduct and support cooperative research to find new, effective biological, cultural, and integrated pest control materials and methods;
- Seek effective, specific, nonpersistent pesticides and methods of application least hazardous to man and his environment;
- Require pesticide product labels which adequately inform all users of the composition and the proper permitted use of each formulation;
- Review and update all pesticide registrations, eliminating any uses not in conformity with current criteria of safety and efficacy;
- Cooperate with other public and private organizations and industry in the development and evaluation of pest control materials and methods, assessment of benefits and potential hazards in control operations, monitoring for pesticide residues, and dissemination of pesticide safety information.

All users of pesticides, whether in the home, garden, field, forest, or aquatic area or for public health and sanitary purposes, are strongly urged to heed label directions and exercise constant care in pesticide application, storage, and disposal for the protection of people, animals, and our total environment.

The Department commends this policy to all who use, recommend, or regulate pesticides.

/s/ Clifford M. Hardin
Secretary of Agriculture

With this issuance, Secretary's Memorandum No. 1565, dated December 23, 1964, is hereby superseded.

UNITED STATES DEPARTMENT OF AGRICULTURE

Farkas DU 8-5208

McDavid DU 8-4026

Washington, Nov. 13, 1969

Hardin Calls for More Environmental Protection
in Pesticides Registration:

Secretary of Agriculture Clifford M. Hardin today directed that protection of the environment from contamination by persistent pesticides receive greater emphasis in the registration of new pesticide products and review of those already registered by the Department of Agriculture.

The directive is concerned with those pesticides which will persist in the environment, beyond the current growing season for a crop or one year for non-crop uses. This would include DDT and many other chlorinated hydrocarbon chemicals which are generally the most persistent of the pesticides.

“This action will enable the Department of Agriculture to better discharge its responsibilities for the regulation of pesticide products in the public interest,” the Secretary said. “It makes our registration requirements and procedures more responsive to the latest research findings on pesticide effects and related public concern over environmental pollution.”

The instructions issued by Secretary Hardin directed that, in connection with pesticide registrations, particular consideration be given to the following, among other factors:

- the period of time and the conditions under which the product will persist in the environment.
- whether because of solubility and mobility the product will be likely to be moved out of the area of use, and what potential effects may be anticipated.
- whether the product is subject to transformation into other chemicals which might have adverse effects

upon the environment and through the environment on living man and useful vertebrate animals, useful vegetation, or useful invertebrate animals.

- [2] — whether there is a need for the product for the prevention or control of human disease and other essential uses for which no alternative is available.

Under the Federal Insecticide, Fungicide, and Rodenticide Act, the Secretary of Agriculture is responsible for the regulation of all pesticide products marketed in interstate commerce. The law requires that all such products be registered with USDA on the basis of scientifically proven effectiveness and safety to humans, crops, livestock, and wildlife when used as directed.

- - -

USDA 3508-69

from the standpoint of their effects on the environment. The committee submitted its report in May of 1969, and recommended that immediate attention be given to the problem of buildup of persistent pesticides in the total environment. The Commission on Pesticides and Their Relationship to Environmental Health, appointed by the Secretary of Health, Education, and Welfare, recommended in its report of November 1969, that all uses of DDT be eliminated except those uses essential to the preservation of human health and welfare.

Current information on levels of DDT in the environment warrant the discontinuation of widespread use of DDT when such use is not essential in the production of food or the protection of health. Therefore, continued registration under the Federal Insecticide, Fungicide, and Rodenticide Act for products containing DDT bearing directions for use as indicated below is not considered to be in the public interest.

1. All uses on shade trees, including elm trees for control of the elm bark beetle which transmits the Dutch elm disease.
2. All uses on tobacco.
- [2] 3. All uses in or around the home except limited uses for control of disease vectors as determined by public health officials.
4. All uses in aquatic environments, marshes, wetlands, and adjacent areas, except those which are essential for the control of disease vectors as determined by public health officials.

In accordance with the provisions of Section 4 of the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 135d) you are hereby notified that products containing DDT which are registered under the Act with directions for such uses are no longer considered to be in compliance with the provisions of the Act and the registration of such products is canceled effective 30 days following the

PR Notice 69-17

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Pesticides Regulation Division
Washington, D. C. 20250

November 20, 1969

NOTICE TO MANUFACTURERS, FORMULATORS,
DISTRIBUTORS, AND REGISTRANTS OF
ECONOMIC POISONS

Attention: Person responsible for Federal registration
of economic poisons

CANCELLATION OF REGISTRATION OF DDT
PRODUCTS FOR CERTAIN USES.

During the past 25 years DDT has been used extensively for the control of a variety of insect pests. In addition to widespread agricultural use it has been invaluable in the control of certain vectors of diseases. Its continued widespread use and relatively slow dissipation has resulted in contamination of the environment with low levels of DDT. Trace residues can often be detected in areas far removed from sites of application. This was recognized by the President's Science Advisory Committee in its report of May 15, 1963, entitled, "Use of Pesticides." The report recommended an orderly reduction in the use of persistent pesticides with their elimination being the goal. The report of the Environmental Pollution Panel of the PSAC entitled, "Restoring the Quality of Our Environment" also expressed concern over the persistence of pesticides in the environment, and recommended more stringent controls.

In November of 1966 the Department of Agriculture requested that a committee be appointed by the National Research Council to appraise the significance of residues

42 App.

receipt of this notice; unless, all directions for such uses are immediately deleted from the labels of such products or other procedures provided for under Section 4.c. of the Act are invoked.

Five copies of corrected labeling must be submitted to the Registration Branch, Pesticides Regulation Division, Agricultural Research Service, U.S. Department of Agriculture, Washington, D.C. 20250, if continued registration is desired.

Withdrawal or relabeling is not considered necessary for products already in channels of trade which bear directions for uses outlined above.

/s/ Harry W. Hays
Director

DEPARTMENT OF AGRICULTURE

Agricultural Research Service

ECONOMIC POISONS CONTAINING

DDT FOR CERTAIN USES

Proposed Cancellation of Registration

During the past 25 years DDT has been used extensively for the control of a variety of insect pests. In addition to widespread agricultural use it has been invaluable in the control of certain vectors of diseases. Its continued widespread use and relatively slow dissipation has resulted in contamination of the environment with low levels of DDT. Trace residues can often be detected in areas far removed from sites of application. This was recognized by the President's Science Advisory Committee in its report of May 15, 1963, entitled, "Use of Pesticides." The report recommended an orderly reduction in the use of persistent pesticides with their elimination being the goal. The report of the Environmental Pollution Panel of the PSAC entitled, "Restoring the Quality of Our Environment" also expressed concern over the persistence of pesticides in the environment, and recommended more stringent controls.

In November of 1966 the Department of Agriculture requested that a committee be appointed by the National Research Council to appraise the significance of residues from the standpoint of their effects on the environment. The committee submitted its report in May of 1969, and recommended that immediate attention be given to the problem of buildup of persistent pesticides in the total environment. The Commission on Pesticides and Their Relationship to Environmental Health, appointed by the Secretary of Health, Education, and Welfare, recommended in its report of November 1969 that all uses of DDT be eliminated except those uses essential to the preservation of human health and welfare.

Current information on levels of DDT in the environment warrant the discontinuation of widespread use of DDT when

44 App.

such use is not essential in the production of food or the protection of health. Therefore, continued registration under the Federal Insecticide, Fungicide, and Rodenticide Act for products containing DDT bearing directions for use as indicated below is not considered to be in the public interest.

Action is being taken to cancel certain uses which contribute significantly to contamination of the environment. These are as follows:

1. All uses on shade trees, including elm trees for control of the elm bark beetle which transmits the Dutch elm disease.
2. All uses on tobacco.
3. All uses in or around the home except limited uses for control of disease vectors as determined by public health officials.
4. All uses in aquatic environments, marshes, wetlands, and adjacent areas, except those which are essential for the control of disease vectors as determined by public health officials.

Registrants have been advised on cancellation of registration for DDT products bearing directions for use as indicated above.

The Department is considering cancellation of any other uses of DDT unless it can be shown that certain uses are essential in the protection of human health and welfare and only those uses for which there are no effective and safe substitutes for the intended use will be continued. This notice is to afford interested persons an opportunity for a period of 90 days to submit views and comments on this proposal.

All persons who desire to submit written data, views, or arguments in connection with this matter should file the same with the Director, Pesticides Regulation Division, Agricultural Research Service, U.S. Department of Agriculture, Washington, D.C. 20250, within 90 days after the date of publication of this notice in the *Federal Register*. Please make reference in any submissions to "F.R. DDT Notice."

All written submissions made pursuant to this notice will be made available for public inspection at such time and places and in a manner convenient to the public business (7 CFR 1.27(b)).

Done at Washington, D.C. this 20th day of November 1969.

HARRY W. HAYS,
Director,
Pesticides Regulation Division.

[F.R. Doc. 69-14024; Filed, Nov. 24, 1969; 8:50 a.m.]

No. 226-5

FEDERAL REGISTER, VOL. 34, NO. 226-TUESDAY, NOVEMBER 25, 1969

IN THE
UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 23,813

ENVIRONMENTAL DEFENSE FUND, INCORPORATED; SIERRA CLUB;
WEST MICHIGAN ENVIRONMENTAL ACTION COUNCIL; NATIONAL
AUDUBON SOCIETY; and IZAAK WALTON LEAGUE OF AMERICA,
Petitioners,

v.

CLIFFORD M. HARDIN, Secretary of Agriculture,
and UNITED STATES DEPARTMENT OF AGRICULTURE,
Respondents.

Petition for Review of Order of the
United States Department of Agriculture

**REPLY BRIEF AND SUPPLEMENTAL MEMORANDUM
FOR THE PETITIONERS**

JAMES W. MOORMAN
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INDEX

INTRODUCTION	1
ARGUMENT	2
I. This Court May Review Final Orders Under FIFRA Other Than Those Which Come At The End Of A Section 4c Proceeding	2
A. Respondents Have Finally Denied the Petitioners' Requests and Judicial Review Is Appropriate	2
B. Courts Of Appeals May Review Orders of Administrative Agencies Which Are Not Based On Formal Hearings and Are Not "Affirmative" Orders	4
II. Petitioners Have Standing To Obtain Review	6
III. This Court Has Jurisdiction Under 5 U.S.C. § 706(1) and 28 U.S.C. § 1651, Ancil- lary To Its Jurisdiction To Review Orders Under Section 4d of FIFRA, To Fashion An Order To Compel Prompt Agency Action On the October 31, 1969 Petition	8
A. The All Writs Statute	8
B. Jurisdiction Under 5 U.S.C. § 706(1)	10
CONCLUSION	14

CITATIONS

CASES:

Algonquin Gas Transmission Company v. F.P.C., 201 F.2d 334 (1st Cir. 1953)	4
American Broadcasting Co. v. F.C.C., 191 F.2d 492 (D.C. Cir. 1951)	11
*American Chain & Cable Co. v. F.T.C., 142 F.2d 909 (4th Cir. 1944)	10
*Association of Data Processing Service Organizations, Inc. v. Camp, 38 L.W. 4193 (March 3, 1970)	7
*Barlow v. Collins, 38 L.W. 4195 (March 3, 1970)	7

Cities Service Gas Co. v. F.P.C., 255 F.2d 860 (10th Cir. 1956)	4
*City of Chicago v. United States, ____U.S.____, 90 S.Ct. 309 (1969)	5, 6
*Curran v. Laird, No. 21,040 (November 12, 1969)	7
*Foti v. Immigration and Naturalization Service, 375 U.S. 217 (1963)	12
*F.T.C. v. Dean Foods Co., 384 U.S. 597 (1966)	7, 10
Giova v. Rosenberg, 379 U.S. 18 (1964)	13
Goldman v. Folsom, 246 F.2d 776 (3rd Cir. 1957)	13
*Harvey Radio Laboratories, Inc. v. United States, 110 U.S. App. D.C. 81, 289 F.2d 458 (1961)	11, 12
Hungerford v. United States, 307 F.2d 99 (9th Cir. 1962)	1
Isbrandtsen Co. v. United States, 93 U.S. App. D.C. 293, 211 F.2d 51 (1954)	4
*Kessler v. F.C.C., 117 U.S. App. D.C. 130, 326 F.2d 673 (1963)	11, 12
*McClellan v. Carland, 217 U.S. 268 (1910)	9, 10
Miller v. Ribicoff, 195 F. Supp. 534 (W.D.S.C. 1961)	13
Mustain v. United States, 314 F.2d 113 (10th Cir. 1963)	5
Office of Communication of United Church of Christ v. F.C.C., 123 U.S. App. D.C. 328, 359 F.2d 994 (1966)	7, 8
People v. United States Department of Agriculture, No. 22,574 (D.C. Cir. February 2, 1970)	7
Phillips Petroleum v. F.P.C., 227 F.2d 470 (10th Cir. 1955), <i>cert. denied</i> , 350 U.S. 1005 (1955)	4

Rochester Telephone Corp. v. United States, 307 U.S. 125 (1939)	5
*Scanwell Laboratories, Inc. v. Thomas, No. 22,863 (D.C. Cir. February 13, 1970)	6, 7
Scenic Hudson Preservation Conference v. F.P.C. 354 F.2d 608 (2d Cir. 1965)	7
Trailways of New England, Inc. v. C.A.B., 412 F.2d 926 (1st Cir. 1969)	4
Trans-Pacific Freight Conference of Japan v. F.M.B., 112 U.S. App. D.C. 290, 302 F.2d 875 (1962)	4
Willapoint Oyster Co. v. Ewing, 174 F.2d 676 (9th Cir. 1949), <i>cert. denied</i> , 338 U.S. 860	13

STATUTES

Federal Statutes

Administrative Procedure Act:

Section 2, 60 Stat. 237, as amended 5 U.S.C. § 551(b)	3
Section 10(c)A, 60 Stat. 243, as amended 5 U.S.C. § 706(1)	8, 10, 11, 12, 13

All Writs Statute

28 U.S.C. § 1651	<i>passim</i>
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Clayton Act

15 U.S.C. § 45	9
--------------------------	---

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

61 Stat. 166ff, as amended by 76 Stat. 190ff, Section 2-4, 7 U.S.C. 135-135b	<i>passim</i>
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REGULATIONS

7 C.F.R. 362.3	6
34 Fed. Reg. 18827	2

LEGISLATIVE MATERIALS

H. Rept. No. 91-637, 91st Cong., 1st Sess	3, 4
--	------

BOOKS AND PERIODICALS

Jaffe, <i>Judicial Control of Administrative Action</i>	13
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802

IN THE

UNITED STATES COURT OF APPEALS

FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 23,813

ENVIRONMENTAL DEFENSE FUND, INCORPORATED; SIERRA CLUB;
WEST MICHIGAN ENVIRONMENTAL ACTION COUNCIL; NATIONAL
AUDUBON SOCIETY; and IZAAK WALTON LEAGUE OF AMERICA,
Petitioners,

v.

CLIFFORD M. HARDIN, Secretary of Agriculture,
and UNITED STATES DEPARTMENT OF AGRICULTURE,
Respondents.

Petition for Review of Order of the
United States Department of Agriculture

**REPLY BRIEF AND SUPPLEMENTAL MEMORANDUM
FOR THE PETITIONERS**

INTRODUCTION

In their answering brief Respondents have refused to argue the merits of their decisions (1) not to suspend DDT registrations, and (2) not to issue Section 4c notices to begin proceedings to cancel DDT registrations.¹ In addition, while Respondents continue to raise the issue of the standing of the Petitioners to obtain review, they did not devote any argument to that point. Respondents only argued their contention that this Court cannot review Respondents' action on the ground that it is not a final order. Petitioners will, therefore, address primarily the final order point, but

¹Such a refusal to present an argument on the merits "may be tantamount to a confession of error." *Hungerford v. United States*, 307 F.2d 99, 102, n.5 (9th Cir. 1962).

will also review several standing cases which have been issued since Petitioners filed their Brief.²

In addition, Petitioners will respond to the Court's request, transmitted to counsel by the Clerk on March 5, 1970, for a Supplemental Memorandum addressed to certain aspects of this Court's jurisdiction.

ARGUMENT

I

THIS COURT MAY REVIEW FINAL ORDERS UNDER FIFRA OTHER THAN THOSE WHICH COME AT THE END OF A SECTION 4c PROCEEDING

A. Respondents Have Finally Denied the Petitioners' Requests and Judicial Review Is Appropriate

Respondents denied the Petitioners' request for immediate suspension and, with the exception of four uses of DDT, denied Petitioners' request that Section 4c notices issue initiating cancellation proceedings. Respondents' denial is embodied in three documents (App. 34-45): (1) Respondents' letter of December 11, 1969, to Petitioners, (2) Respondents' Section 4c notice of November 20, 1969, for four uses of DDT, and (3) Respondents' notice of November 25, 1969, (34 F.R. 18827), inviting comment from the public at large on "any other uses of DDT." These documents, read together, clearly establish that the Respondents finally disposed of Petitioners' requests. The Petition has been rejected and is no longer under active consideration. The Respondents nowhere come to grips with these basic facts.

The Respondents' order, denying the relief sought by Petitioners, is reviewable under Section 4d of FIFRA. The first sentence of Section 4d of FIFRA says:

²Petitioners also note Respondents' unsupported statement (Brief for Respondents, p. 6, n. 3) that the principal uses of DDT as to which Respondents have not taken any action involves food crops. In fact, the largest use of DDT in the United States is for cotton production.

“In case of actual controversy as to the validity of *any order under this section*, any person who will be adversely affected by such order may obtain judicial review by filing in the United States Court of Appeals . . . a petition praying that the order be set aside in whole or in part.” (Emphasis added.)

The action of Respondents in denying the relief requested is an order under this section.³ Petitioners asked for and were denied two forms of Section 4c relief.

Respondents assert that only orders issued after Section 4c proceedings are reviewable. It is, of course, true that such orders are reviewable under Section 4d. Respondents do not, however, cite any authority to support their theory that judicial review of other orders issued by Respondents under Section 4 of FIFRA is precluded.

While the order in this case does not come at the end of Section 4c proceedings, the facts are that Respondents have never completed a Section 4c proceeding and, obviously, have never issued an order following such proceedings.

With regard to cancellation, the House Government Operations Committee reported on November 13, 1969, that Respondents “*never* secured cancellation of a registration in a contested case” (emphasis in original) and that “when registrants receiving cancellation notices requested hearings or studies, prosecution of the cancellation was halted and the product left on the market.”⁴ With regard to initial registrations, Respondents have allowed the registration of at least 1,600 products since Section 4c was added to FIFRA over the objections of the Public Health Service without initiating Section 4c proceedings.⁵ In ad-

³See definition of order in 5 U.S.C. § 551(b) (Brief for Petitioners, p. 32).

⁴Pp. 15-16, Deficiencies in Administration of Federal Insecticide, Fungicide, and Rodenticide Act, H. Rept. No. 91-637, 91st Cong., 1st Sess. (hereafter cited H. Rept. 91-637).

⁵H. Rept. 91-637, *supra*, at 14, 36-37.

dition, the Respondents have only used that power to suspend *once* and in fact left products with identical active ingredients on the market that time.⁶

Thus, it appears to be Respondents' practice to decide these matters in favor of manufacturers without issuing an order following Section 4c proceedings as they insist on here. Respondents' denial of Petitioners' request is not only final, it is as final an order as has ever been produced by Respondents under FIFRA. Respondents' position in this case, therefore, when put in the context of the actual way Respondents administer FIFRA, would deny to Petitioners the right of review in this Court that Congress intended them to have.

B. Courts of Appeals May Review Orders of Administrative Agencies Which Are Not Based On Formal Hearings and Are Not "Affirmative" Orders

Courts of Appeals may, under direct review statutes, review final orders that are not based on formal hearings. Petitioners cited several cases where Courts of Appeals (Brief, pp. 33-34), including this Court, reviewed such orders.⁷ In each case cited, the effect of the order reviewed was similar to the order in this case in that the agency's denial of a prehearing request set legal consequences. Of great significance is the fact that several of the cases cited involve review of agency orders deny-

⁶H. Rept. 91-637, *supra*, at 16.

⁷*Isbrandtsen v. United States*, 93 U.S. App. D.C. 293, 211 F.2d 51 (1954); *Cities Service Gas Co. v. F.P.C.*, 255 F.2d 860 (10th Cir. 1958); *Trailways of New England, Inc. v. C.A.B.*, 412 F.2d 926 (1st Cir. 1969); *Trans-Pacific Freight Conference of Japan v. F.M.B.*, 112 U.S. App. D.C. 290, 302 F.2d 875 (1962); *Phillips Petroleum v. F.P.C.* 227 F.2d 470 (10th Cir. 1955), *cert. denied*, 350 U.S. 1005 (1955); *Algonquin Gas Transmission Co. v. F.P.C.*, 201 F.2d 334 (1st Cir. 1953).

ing or granting suspension which were similar to the denial of suspension in this case.⁸

Respondents' insistence that it is improper for the Court of Appeals to review their order in this case seems to be mistakenly rooted in the now discarded negative order concept. Respondents complain (Brief for Respondents, p.20) that Petitioners are not asking this Court "to review an affirmative order" The Supreme Court has just this past December again rejected the negative-affirmative order distinction. *City of Chicago v. United States*, ____ U.S. ____, 90 S.Ct. 309 (1969).⁹

In *City of Chicago*, two railroad companies had filed notices with the ICC of the discontinuation of interstate passenger trains. The ICC opened investigations of the discontinuances, but found that continued operation of the trains was not required by public convenience and necessity and entered orders terminating its investigations. The City of Chicago and other interested parties sought review before a special three judge district court under 28 U.S.C. § 1336(a). The three judge court held that the ICC's action was not a reviewable order and a direct appeal to the Supreme Court followed.

The Court noted that the decision of the ICC not to challenge the discontinuance was on the merits and as much an order as an order directing continuance of service, in which event the Court said the carrier could certainly obtain review. The Court held the close of the investigation to be a reviewable order.

⁸ Respondents cite only one case where it was held that an action taken before a hearing was not a reviewable order. *Mustain v. United States*, 314 F.2d 113 (10th Cir. 1963). Of importance is the fact that the Court in *Mustain*, citing *Columbia Broadcasting System v. United States*, recognized the principle that a reviewable final order can come before a statutory hearing.

⁹ See *Rochester Telephone Corp. v. United States*, 307 U.S. 125, 142-143, 59 S.Ct. 754, 763-765 (1939).

As in this case, the final reviewable orders in *City of Chicago* were orders prior to any formal administrative hearing such as respondents here insist on. The fact the ICC preserved the *status quo*, giving its decision not to challenge the discontinuance a negative cast, made its action no less a reviewable order. In like fashion, Respondents' "negative order"—refusing to initiate Section 4c proceedings—is a final reviewable order.¹⁰

II

PETITIONERS HAVE STANDING TO OBTAIN REVIEW

Petitioners are five major environmental protection and conservation organizations. They seek relief from Respondents and this Court from what they consider to be one of our most serious environmental problems under a statute designed to deal with that problem.

In its recent decision in *Scanwell Laboratories, Inc. v. Thomas*, No. 22,863 (D.C. Cir., February 13, 1970), this Court noted the possibility that capricious litigants might attempt to exploit the broader rules on standing with frivolous litigation. (Slip Op., p. 25) It is clear, however, that the Petitioners in the instant case—representing as they do some of the most substantial and well established conser-

¹⁰ Respondents assert at the end of their Brief (p. 22) that their denial of Petitioners' request is not a final order because it was not signed by the judicial officer. (Respondents, however, go on to say that had the judicial officer signed an order it would make no difference). The Director of the Pesticide Regulation Division, Dr. Harry Hays, is clearly the officer of Respondent Department of Agriculture charged with the responsibility of enforcing FIFRA (see 7 CFR 362.3). He in fact issued the Section 4c notice for the four uses of DDT and the notice in the Federal Register for all other uses. He is clearly the party who would issue a suspension notice to registrants of DDT products, not the judicial officer. He is also under the direct supervision of Respondent Hardin. Dr. Bayley, who signed the December 11 order in response to the Petition, works directly in the office of Respondent Hardin, and handled this matter for him.

vation interests in the country—have standing to litigate this important environmental issue. By any standard, Petitioners must be classified as “meritorious sheep,” not “capricious goats.” *Ibid.*

Petitioners invite the Court’s attention to two opinions of the Supreme Court on standing handed down last week, *Association of Data Processing Service Organizations, Inc. v. Camp*, 38 L.W. 4193 (March 3, 1970), and *Barlow v. Collins*, 38 L.W. 4195 (March 3, 1970). As stated by the Supreme Court in *Data Processing*, the question of standing is “whether the interest sought to be protected by the complainant is arguable within the zone of interests to be protected or regulated by the statute or constitutional guarantee in question.” (38 L.W. at 4194.) The interests sought to be protected by Petitioners are clearly within the zone of interests protected by FIFRA. The Court explicitly recognized “that interest, at times, may reflect ‘aesthetic, conservation, and recreational’ as well as economic values” and cited with approval the two cases principally relied upon by the Petitioners, *Scenic Hudson Preservation Conference v. F.P.C.*, 354 F.2d 608 (2d Cir. 1965), and *Office of Communication of United Church Of Christ v. F.C.C.*, 123 U.S. App. D.C. 328, 359 F.2d 994 (38 L.W. at 4194). Also of interest was the following statement of the Court:

“The right of judicial review is ordinarily inferred where congressional intent to protect the interests of the class of which the plaintiff is a member can be found; in such cases, unless members of the protected class may have judicial review the statutory objectives might not be realized.” *Barlow v. Collins*, 38 L.W. at 4197-98.

Petitioners also invite the Court’s attention to two of its own recent opinions on the standing question, *Scanwell Laboratories, Inc. v. Thomas*, *supra*, and *People v. United States Department of Agriculture*, No. 22,574 (D.C. Cir., February 2, 1970). These cases strongly reinforce the early holdings of this Court in *Curran v. Laird*, No. 21,040 (November 12, 1969), and *Office of Communication of United*

Church of Christ v. F.C.C., *supra*. The principle that an appropriate citizen group can obtain standing under statutes designed to protect the public interest is now beyond question. Petitioners have conclusively demonstrated (Brief for Petitioners, pp. 26-31) that FIFRA was designed to protect the public from hazardous pesticides, that Congress intended that appropriate public representatives would have standing under FIFRA, and that Petitioners are in fact appropriate representatives of the public interest.

III

THIS COURT HAS JURISDICTION UNDER 5 U.S.C. § 706(1) AND 28 U.S.C. § 1651, ANCILLARY TO ITS JURISDICTION TO REVIEW ORDERS UNDER SECTION 4d OF FIFRA, TO FASHION AN ORDER TO COMPEL PROMPT AGENCY ACTION ON THE OCTOBER 31, 1969 PETITION

On March 11, 1970, this Court asked the parties to submit supplemental memoranda "directed to whether this Court has jurisdiction to fashion an order to compel prompt agency action on the October 31, 1969, petition filed with the Secretary of Agriculture under the provisions of 5 U.S.C. Sec. 706(1)."

Petitioners' position, set forth in their Brief (pp. 31-37) and Reply Brief (*supra*, p. 2), is that Respondents have in fact issued a final order on the Petition and that that order is reviewable under Section 4d of FIFRA in this Court. Petitioners will further contend: (a) if such an order has not been issued, the Court has jurisdiction to compel the Respondents to issue a final order responding to the Petition; and (b) the Court has jurisdiction to order the Respondents to issue Section 4c notices, commencing the administrative proceedings which could lead to cancellation of DDT registrations.

A. The All Writs Statute

This Court has jurisdiction under Section 4d of FIFRA to review any order issued by Respondents under Section 4. The All Writs Statute, 28 U.S.C. § 1651, confers addi-

tional jurisdiction on this and other federal courts to “issue all writs necessary and appropriate in aid of their respective jurisdictions and agreeable to the usages and principles of law.” Assuming, *arguendo*, that Respondents failed to issue an order in response to Petitioners’ request, their inaction would effectively defeat the Section 4d review jurisdiction of this Court. In such cases this Court has jurisdiction to fashion an order compelling the agency to act in aid of its jurisdiction under Section 4d of FIFRA.

When a reviewing court’s statutory jurisdiction to review the decisions of a lower tribunal might be defeated by the lower tribunal’s improper failure to act, the court has jurisdiction to compel the lower tribunal to act, notwithstanding the fact that its statutory review jurisdiction has not yet attached. In *McClellan v. Carland*, 217 U.S. 268 (1910), the Supreme Court firmly established this principle. In that case a federal circuit court had stayed a proceeding before it while a related case went forward in a state court. A petition for a writ of mandamus was filed in the circuit court of appeals to compel the circuit court to proceed with and determine the stayed action. The circuit court of appeals denied the relief requested and dismissed the petition. The Supreme Court reversed the circuit court of appeals, and held that the circuit court of appeals had jurisdiction to issue the writ under the predecessor statute to the All Writs Statute. The Supreme Court rejected the argument that the All Writs Statute applies only after jurisdiction attaches. Rather, the Court held that the circuit court of appeals had jurisdiction to compel the lower tribunal “to proceed to final judgment in order that [the] court may exercise the jurisdiction of review given by law.” 217 U.S. at 280.

The jurisdiction conferred on appellate courts under the All Writs Statute was elaborated upon in *F.T.C. v. Dean Foods Co.*, 384 U.S. 597 (1966). In *Dean Foods*, the Supreme Court dealt with a problem coming out of an administrative agency. Under the Clayton Act, 15 U.S.C. § 45, the courts of appeals have limited power to review decisions of the FTC, after the FTC has gone through specified stat-

utory procedures and issued a final order. In *Dean Foods*, the FTC sought to invoke the jurisdiction of the Court of Appeals prior to the statutory proceedings to obtain an order that would preserve the *status quo* and assure the Court an opportunity to exercise its jurisdiction meaningfully under the statutory review procedures. The Supreme Court held that courts of appeals had jurisdiction under the All Writs Statute to issue an order in aid of its jurisdiction notwithstanding the fact that final agency action had not been taken and review under the Clayton Act's provisions was unavailable. The Court relied upon *McClellan v. Carland*, *supra*, in reaching this result. As the Fourth Circuit said in *American Chain & Cable Co. v. Federal Trade Commission*, 142 F.2d 909, 912 (4th Cir. 1944), on direct review of a Federal Trade Commission matter:

“... [M]andamus from a court is an appropriate remedy to require an administrative commission to exercise the power with which it is vested. . . . [W]here it is given jurisdiction to review an administrative commission there is no reason why the power should not be exercised in the same way as where reviewing power is given over a court.”

Under the *McClellan* and *Dean Foods* decisions, it is clear that this Court has jurisdiction under the All Writs Statute to fashion an order compelling prompt action by respondents on the October 31 Petition. The continuing failure of Respondents to issue an order—if past actions of Respondents do not constitute an order—would effectively defeat the jurisdiction of this Court to review the decisions of Respondents under Section 4d of FIFRA. In a variety of contexts the courts of appeals have issued orders to lower tribunals—courts and agencies—to avoid such a result.

B. Jurisdiction Under 5 U.S.C. § 706(1)

The Administrative Procedure Act outlines the scope and nature of judicial oversight of the action of administrative agencies. Section 10(e), 5 U.S.C. § 706(1), provides, in relevant part:

“The reviewing Court shall (1) compel agency action unlawfully withheld or unreasonably delayed”

Under this statute, litigants are given a remedy for agency inaction; and the courts are given jurisdiction to compel an agency to issue an order when it is bound by law to do so. In the instant case, assuming that no order has been issued in response to the Petition of October 31, 1969, Section 706(1) gives this Court jurisdiction to compel the issuance of such an order.

Jurisdiction of the courts under Section 706(1) complements the courts' jurisdiction under the All Writs Act. Indeed, if the courts did not have such power in the present context, reviewing jurisdiction under Section 4d of FIFRA would be defeated. The clear intent of Section 706(1) is to permit such judicial intervention to compel action in instances in which the administrative process is unreasonably delayed.¹¹

This Court has in fact assumed jurisdiction to consider the grant of Section 706(1) relief in a similar case, *Harvey Radio Laboratories, Inc. v. United States*, 110 U.S. App. D.C. 81, 289 F.2d 458 (1961). In *Harvey*, an application for a radio license was delayed in the FCC while several rule-making proceedings were underway. The applicant's request that the agency act was denied. The applicant sought direct review in this Court “on the ground that agency action has been unreasonably delayed in contravention of Section 10 of the Administrative Procedure Act [5 U.S.C. § 706(1)]” 289 F.2d at 459-60. Asserting that agency inaction is a proper subject of judicial scrutiny, 289 F.2d at 461, the Court exercised its jurisdiction and concluded that the agency delay was not unreasonable on the facts of the case. See also *Kessler v. F.C.C.*, 117 U.S. App. D.C. 130, 356 F.2d

¹¹The Court has, in addition, under its general equitable jurisdiction, the power to issue injunctions to compel administrative agencies to take action without unreasonable delay. *American Broadcasting Co. v. F.C.C.*, 191 F.2d 492 (D.C. Cir. 1951).

673, 684, n. 10 (1963) (court of appeals will order agency to proceed to hearing where delay is excessive).

The analogy with this case is clear. The Court of Appeals has jurisdiction to review directly orders of an agency in both instances. In *Harvey* this Court, which had jurisdiction to review FCC action, entertained a claim under Section 706(1) that such action was unreasonably delayed or unlawfully withheld. Similarly, in the instant case, the Court, which has jurisdiction to review Section 4d orders, can compel Respondents to act promptly on the Petition of October 31, 1969.

The assumption of Section 706(1) jurisdiction by this Court in *Harvey* and *Kessler* has the virtue of avoiding an undesirable split of review between the courts of appeals and the district courts. A Section 706(1) order is properly issued by an appellate court in the present circumstances since review of Respondents' orders issued under Section 4 of FIFRA is in the courts of appeals. Litigants should turn for relief from agency inaction under Section 706(1) to the courts that will have review jurisdiction after a final order. Precedent, commentators, and common sense all militate against bifurcation of review between court of appeals and district court.

In *Foti v. Immigration and Naturalization Service*, 375 U.S. 217 (1963), the Supreme Court set forth the reasons why split review should be disfavored. The Immigration and Nationality Act gives the courts of appeals jurisdiction to review "final orders of deportation" under a specific section of the Act. Foti conceded his deportability in agency proceedings and sought instead a discretionary suspension of the deportation order under a different section of the Act. The issue before the court was whether the denial of the suspension was properly reviewable in the Court of Appeals as a "final order of deportation." The Supreme Court held that the Court of Appeals was the proper forum for review, noting the inconvenience and delay of bifurcated review and the fact that such review was "not the necessary result

from a fair interpretation of the pertinent statutory language.” Professor Jaffe approved the *Foti* result and urged consolidation of review in a single court to the greatest extent possible. *Judicial Control of Administrative Action*, p. 422.¹²

Thus, it is clear that this Court has jurisdiction under Section 706(1) to compel agency action with regard to those matters over which it would ultimately have direct review jurisdiction under FIFRA. The matters raised by the Petition of October 31, 1969, are clearly ones which should be ultimately reviewable in the courts of appeals, *i.e.*, deregistration and suspension of DDT registrations.

Section 706(1) is relevant to another aspect of this appeal. In their prayer for relief in this Court, Petitioners requested the Court to set aside the Respondents’ order of December 11, 1969, and to order the Respondents to issue Section 4c notices to commence the administrative proceedings which can lead to cancellation. The authority of this Court to compel such agency action, where the Court has jurisdiction under a direct review statute and the action has been unlawfully withheld, is also inherent in Section 706(1). This section explicitly states that courts shall order agencies to take actions unlawfully withheld. The Petitioners have established that the relief requested from Respondents was unlawfully withheld (Petitioners’ Brief, pp. 10-26).¹³

¹²The Supreme Court has since extended the principle of consolidating agency review in a single court to decisions of the Board of Immigration Appeals denying motions to reopen deportation proceedings. *Giova v. Rosenberg*, 379 U.S. 18 (1964).

The policy of keeping in one court all aspects of the review of an agency’s action is consistent with the principle that special administrative review statutes, such as Section 4d of FIFRA, “are in *pari materia*” with the Administrative Procedure Act. *Willapoint Oyster Co. v. Ewing*, 174 F.2d 676, 686 (9th Cir. 1949), *cert. denied* 338 U.S. 860, 70 S.Ct. 101, *Miller v. Ribicoff*, 195 F.Supp. 534, 535 (W.D.S.C. 1961), *Goldman v. Folsom*, 246 F.2d 776 (3rd Cir. 1957).

¹³Petitioners observe that if there is any difficulty with a lack of record which impedes the Court in fashioning an order, it may remand

CONCLUSION

For all the reasons set forth in their Brief and this Reply Brief and Supplemental Memorandum, Petitioners respectfully request this Court to grant the relief sought.

Respectfully submitted.

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the matter to Respondents under Section 4d of FIFRA to adduce evidence upon such terms and conditions as may seem proper to the Court. There is certainly no need for this Court to conduct an evidentiary hearing; nor is there any warrant for the suggestion that Respondents do not have the authority to conduct such a hearing on remand.

Senator MUSKIE. Have you focused on what might be the difference between the suits to enforce standards as against suits to evade pollution?

Mr. MOORMAN. I hope the suit to enforce the standard would be an easier suit once your standard is set. Really, I think judges should be eager to make our polluters toe that line. You have the general question of what is pollution and where that line should be if you don't have the standards and that makes it a much more difficult case.

Senator MUSKIE. Well, thank you very much, Mr. Moorman. May I compliment you on your activity in this field. We would be interested in learning anything from your experience as you proceed.

Mr. MOORMAN. Thank you, sir.

Senator MUSKIE. Our second witness this morning is Mr. Stanley Preiser of Charleston, West Virginia.

STATEMENT OF STANLEY PREISER, ESQ., CHARLESTON, W. VA.

Mr. PREISER. Mr. Chairman, I am Stanley Preiser, a practicing lawyer in Charleston, West Virginia, a member of the West Virginia and Kentucky Bars. I appreciate this opportunity to appear this morning with regard to the provisions of Senate Bill 3546.

I would like to apologize for not having a printed memorandum, but time did not permit, between the date of the invitation and today, to do that. I have made some notes and I assure you, I will not go beyond my allotted time.

Pursuant to the telegram request of Senator Muskie, I would like to address my remarks to the provisions of Senate Bill 3546 containing provisions relating to citizens suits to enforce violation of standards; specifically, Section 13. One thing should be made clear: I would like to discuss this only as a trial lawyer without any pretense of expert knowledge in the field of air pollution. That I do not have, but I think I do have considerable knowledge in the trial of cases in the Federal Courts, and in State Courts.

Senator MUSKIE. I wonder if you would give us a little autobiographical data, including the experience you have had in this field.

Mr. PREISER. I have had no experience in air pollution control, although we are presently engaged in investigation the possible filing of a suit and hope to file this summer with the purpose of accomplishing two things: one, for recovery of damages and two, an attempt to abate some of the pollution presently existing in Kanawha County, of which Charleston is the county seat.

My personal experience has been almost 20 years engaged in the trial of law suits. Over 90 percent of my time in recent years has been spent in the trial of law suits. Did you want a personal biography?

Senator MUSKIE. No. That is what I wanted.

I don't want you to go past appropriate bounds of your profession, but can you tell us about the suit?

Mr. PREISER. I don't think it would be proper to discuss the case that we plan to bring, except to say we do plan to bring such an action this summer. We have spent a great deal of time in investigation and preparation. Much of the medical evidence that we intend to utilize has to be worked up by people mostly in the research field. That is the largest problem. Property damage from air pollution I do not believe is

as great a problem to prove as some people think, but the medical damage from air pollution, highly debatable at the moment, is a question of proof.

We have to have a sufficient quantum of proof that lung damage, sinusitis, and so forth, can be established to a preponderance of the evidence as a result of various air polluters and I think we can establish that if we can obtain the proper medical evidence which we believe we will obtain before this summer.

Senator MUSKIE. Will this suit be brought for several plaintiffs?

Mr. PREISER. Yes, we hope to bring the property damage as a class action. If we can establish sufficient damages to get into Federal Court, we will try that. The individual personal injury suits would, of course, be brought separately from our standpoint, procedurally. Frankly, it would give us two shots. If we should drop the ball on the first we will have a chance on the second.

Senator MUSKIE. Will the suits be brought against single defendants?

Mr. PREISER. A group of defendants.

Senator MUSKIE. In the same industry?

Mr. PREISER. Yes, sir.

Senator MUSKIE. Are they identifiable at this time in terms of the kind of pollution?

Mr. PREISER. No, sir. I don't think I can state who we intend to sue.

If I would identify the industry the parties would be easily identifiable. If I would identify the substance the parties would be easily identifiable.

Senator MUSKIE. All right, I just wanted to get as much as I could in the record with regard to your testimony.

Mr. PREISER. With regard to citizens suits, Section 13, it is extremely necessary that the Federal courts be open for these actions in order to assure against overriding political considerations that may exist if such actions were brought in the State courts.

It is also extremely desirous that with regard to control of air pollution that there exist a joint effort between the government and individual agencies and private citizens. The government does not have adequate personnel in numbers or experience to maintain actions that would have the effect of abating air pollution or to have the effect of making certain that the persons who are possible air polluters would be held to the standards that would be set. As Leonard A. Miller and Doyle Borsher of the Office of Regional Activity of the National Air Pollution Control Association said at the annual meeting in New York on June 22, 1969, "In reality, both the private court action by the individual citizen and the local regional regulation by government agencies must be part of the total control picture complimenting rather than supplanting one another." Once we conclude that private citizens suits aid the control of the entire problem and that the Federal Courts are a necessary adjunct to the full use of such suits, we should look to the present situation absent the proposed provisions in Section 13 and then consider whether the proposed provisions are broad enough to give the assistance needed to help resolve the problem of air pollution in this country today. Citizens suits up to this time have been limited mostly to injunctions to abate a nuisance, declaratory judgment actions

to determine the rights of the parties under the existing legislation and the tort action based upon negligence for money damages.

For individual citizens or age group of citizens to bring a declaratory judgment action they must show a justiciable controversy exists between them and the air polluter. This seems to me frequently impossible to do. To maintain a suit for injunction the citizens need to spend large sums of money for expert witnesses and attorneys and other costs that have to go into the preparation of the suit. It is complex and lengthy. Very few citizens are willing to make that expenditure without the hope of obtaining money damages to at least offset the costs of obtaining the injunction. At least damages should offset the cost to help abate the nuisance and to require conformance to the standards. Presently most courts will not award attorneys' fees, expert witness fees, deposition fees, court reporter's fees in this type of action. You are lucky if your bill of costs to cover the most minimal things.

Senator MUSKIE. May I interrupt with one question here? Do you think that recovery of these kinds of costs should be conditioned upon the successful prosecution of the case?

Mr. PREISER. I think they should be conditioned upon the successful prosecution of the case in order to eliminate people from bringing suits without just cause. The better lawyers will not bring them unless they feel rather sure they are going to win them, and in those instances they should be brought and the costs and fees and expenses should be awarded against the air polluter who caused the suit to begin with.

The tort action for damages on behalf of a large number of citizens, each suffering relatively small damages, is the only practical approach to assist in the control of air pollution. If such can be obtained the air polluters are likely to make the expenditure necessary to control the pollution rather than pay damages.

In the present law, class actions are excluded from many Federal Courts under the doctrine that a person damaged must himself be damaged to the sum of \$10,000 or greater to cover the jurisdiction and you cannot lump together the various actions. All of the plaintiffs under the present state of the law must be of different citizenship than all of the defendants. Under the present state of the law 1,000 citizens, for example, who may have suffered damage, and I use now a particular case, to their lawns and shrubs, which can be clearly established due to air pollution, but it is a \$500 or \$600 bill. One thousand people cannot join together to bring this suit today absent the Section 13 of your provision.

Frequently they are relegated to the State Court where they encounter problems which are usually not existent in the Federal courts.

Now, do the proposed conditions accomplish the desire and manifestly needed result? Section 13 does eliminate the \$10,000 jurisdictional requirement and eliminates the diversity of citizenship requirement, but it provides for actions "declaratory and equitable relief" or "for any other appropriate order" where there is an alleged violation of any applicable air quality standard.

This section does not expressly apply to any "legal" as opposed to "equitable" relief unless by implication "legal" relief can be afforded under the provision "for any other appropriate order." Legal relief would include claims for damages, for example. Well, it should be, and I believe it is, the most effective way to control air pollution. I

think also without a specific provision for legal relief and for damages that the courts may exclude such recovery and eliminate this essential and highly desirable assist to air pollution control.

The proposed provisions make no allowance for a jury trial on legal issues. If it is the intention under this provision to give the United States District Court jurisdiction of actions for damages regardless of the amount is controversy or citizenship of the parties, then a jury to assess these damages and to determine the factual disputes and issues is basic to our system of justice.

With regard to citizens actions for injunctions and declaratory judgment in an attempt to abate nuisances and assure compliance with the applicable air quality control standards, the costs to litigants, expert witnesses, attorney's fees, deposition fees and court reporter's fees, as we mentioned before, is a substantial deterrent and will prevent, in my judgment, most citizens from entering into such litigation.

If a provision was made for all expenses, then I do not believe citizens will be deterred from assisting the government in attaining the desired results.

The last proviso of Section 13 to the effect that nothing in this Section shall affect the rights of persons "under any other law to seek enforcement of such standards" should be broadened to make it clear that the Federal Government has not completely preempted the field and this law should not affect any other rights. That would include such rights as redress to grievances and damage to personal property, et cetera, but it should not exclude action or suits under any other law. So limited as it is now, it could be construed by the Courts to completely preempt the field.

In summary, I would specifically suggest that Section 13 contain provisions in addition to those therein contained: one, that the United States District Court have jurisdiction for class actions for damages where the aggregate claims of the class action exceeds \$10,000 or one or more persons whose claims in the aggregate damages exceed \$10,000, if the damages are alleged to be the result of an alleged violation of any applicable air quality standard, plan for implementation or emission requirement established by that section; two, that all legal issues be tried by a jury as in other cases in the United States District Courts; three, that costs be awarded against any person found to be in violation of any applicable air quality standard, plan for implementation or emission requirement and that such costs include investigation and preparation expense, court reporter fees, expert witness fees, deposition fees and legal expenses, jury costs and attorneys fees.

Four, that nothing contained in this law shall in any way affect the right of any person, persons or class to maintain any action or suit in any court, State or Federal, upon any claim legal or otherwise, or to seek enforcement of the standards under any other law.

Five, that a violation of any of the standards shall give to any person damaged or injured as a result of such violation the right to recover money damages for property damage or personal injury sustained, from the person or persons causing said damage or injury or contributing thereto by virtue of such violation.

If I could just take a moment on the contributing question. Let's assume you are in an area in which you have 100,000 people and you are surrounded by chemical plants and let's assume there is a standard

of the permissible amount per thousand parts or million parts of air and four of the five surrounding plants comply with that standard and the fifth plant does not, it exceeds the standard and pollutes the air. Out of the 100,000; 50,000 citizens suffer provable damage from this particular pollutant. It may be the fact that not one of the plants which complied with the standards caused the damage, nor would the pollutant who exceeded the standard cause the damage, but for the pollution of the other persons who complied. It was the one who went over the standard that precipitated the cause and effect that caused the damage, but it needed to contribute with those who complied the standard to do so.

Consequently, I think it is necessary to have language "contributing" as well as "causing" because of the difficult matter of proof as to what caused it.

Yet, I think we can easily show the pollutant. Mr. Miller and Mr. Borsher said:

The private action has certain advantages in the overall air pollution control program as well as advantages for the individual plaintiff.

I think it is necessary if we are going to control air pollution and to abate it, to have citizens actions similar to that which is provided in Section 13 and I hope that you would consider broadening those provisions in accordance with some of the suggestions I have made.

I appreciate the opportunity to have been here this morning.

Senator MUSKIE. Thank you very much, Mr. Preiser.

I don't know if you have had a chance to look at S. 3575 which was introduced on March 10 by Senators McGovern and Hart. It provides a right of action for relief, for protection of the environment from unreasonable infringement, for activity that affects interstate commerce.

I will read one pertinent section of that bill, Section 4(a):

When the plaintiff has made a prima facie showing that the activity of the defendant affecting inter-State commerce is resulting in or reasonably may result in unreasonable pollution, impairment or destruction of the air, water, or land of the United States, the defendant should have the burden of establishing that there is no feasible alternative and that the activity is consistent with the public health safety and welfare and by the paramount concern of the United States for the protection of its air, water, land and public trust from unreasonable destruction.

I will ask the staff to take this down to you. If you object to giving a legal opinion on something you have just seen for the first time, I will understand; but it seems to me to be helpful.

The question, it appears to me, is: What effect will it have on standards? We have been writing legislation to establish standards under the Air Quality Act of 1967. We thought it implicit that the local communities should set emission standards, but S. 3546, as well as S. 3466, both are directed toward standards. It seems to me that the language in the McGovern-Hart bill would take us away from standards.

Mr. PREISER. I don't know offhand whether it does take you away from standards, wouldn't the standards be the evidence as to whether or not there is an "unreasonable" pollution or impairment? Would the standards set the reasonable measure? I think the standards must be minimal, of course, and in some instances must be raised, but I don't know that they are completely contradictory.

Senator MUSKIE. Would standards as established under the Air Quality Act of 1967 or any legislation that has been passed this year be taken as a basis for meeting that test in that legislation if it is passed?

Mr. PREISER. It might well be the measure of what is or is not reasonable.

Senator MUSKIE. Should there be a cross reference to standards in that provision if it were enacted?

Mr. PREISER. That goes beyond my knowledge. I would think, however, that if one Federal act established standards, it would in a court of law be admissible as to the standard and anything below it certainly would be unreasonable, anything above it would not necessarily be reasonable because the standard would probably be the minimum standard and under certain given conditions, additional care would have to be met in order to be reasonable.

I don't think there is a necessity of cross reference unless it is required legislatively. Legally, I don't think there is.

Senator MUSKIE. Thank you very much for your testimony. It is most helpful, I think, in giving us the perspective of a lawyer who is involved in this kind of litigation with respect to the provisions of the bill before us.

Senator Dole?

Senator DOLE. Mr. Chairman, just briefly, as I read the section as a lawyer, not having practiced much in the last 10 years, however, I think the primary problem is a matter of proof. As I understand it, whatever the pollution damage may be, it is a matter of trying to find the source and trying to come up with enough evidence and isolate the culprit, I guess you might say.

Now, does Section 13 really go to the matter of proof? It gives you a right to go into District Court. It gives the Court jurisdiction without meeting some of the requirements, but does it make it any easier for a plaintiff or a class of plaintiffs to make a case?

Mr. PREISER. I don't think it makes it any easier in a damage suit because there is a question of whether or not under Section 13 you are even talking about individual damages to property or person. For example, the language specifically says "for declaratory and equitable relief and any other appropriate order." Would the appropriate order be limited by the declaratory or equitable relief which would eliminate all legal claims?

Senator DOLE. Then what do you see as the real value of this section?

Mr. PREISER. It would assist the suits to abate a nuisance, an injunction, and declaratory judgment actions. Injunctive relief can be included within the prayer for the declaratory judgment. So we can pursue that, but without the award of costs to citizens how will they do it? That is why I am in favor of the citizens suits, but give them something with which to make it work.

Senator DOLE. Are we in effect giving the citizen any more power than he has now if we say we are limited to injunctive relief or declaratory judgments?

Mr. PREISER. I think you have because you have opened the Federal Courts to him. A local polluter of the same residence or citizenship of the plaintiffs would preclude you under the present state of the law from the Federal courts without this provision.

I think it is an essential provision, but I think it needs to be broadened to include the damages to person and property and to include specifically an award to a prevailing party for the expenses and costs of expert witnesses, otherwise citizens will be hesitant to involve themselves in tens of thousands of dollars which would be involved to cover the cost of the suit.

Senator DOLE. Then you said to recover these costs he must prevail in the action. I think the basis being otherwise, you would have a multiplicity of suits. Of course, you said most lawyers would not file a suit unless they had a good case. But there is always that problem.

Mr. PREISER. That is why I said I believe it should be awarded only to the prevailing party. You will have government aid, places to go to get information and assistance from the government agencies in your initial preparation, but if you are not the prevailing party I have the same fear you have, suits harrassment and suits that should not be brought, and I think costs should only be awarded to the prevailing party.

Senator MUSKIE. I would like to ask one other question, Mr. Preiser. Under the McGovern-Hart bill suit would be brought to abate pollution. Under the provision of S. 3546 suit would be brought based upon violation of standards, air quality or emission requirements or a plan for implementation of those standards.

Which is easier to do, a suit to abate pollution or a suit based upon the violation of standards?

Mr. PREISER. It is my personal opinion, I am not sure the other lawyers here will agree, but it is my personal opinion that a suit to enforce the standards is an easier action to maintain than a suit to abate pollution not based upon a violation of standards. However, I think the result will be more easily accomplished with the damage action.

Senator MUSKIE. I think you made your point on damages, and it is one that we will consider. I think it is a reasonable and logical point to make, but now I would like to focus on the question of proof. As Senator Dole says, what is involved here is the question of proving something that would be the basis for relief. Is it easier to prove or to seek abatement of pollution, thus having to prove pollution, or is it easier to prove a violation of standards?

Mr. PREISER. I think it is much easier to prove a violation of standards. You have established standards. You must have a reporting process as to whether or not persons who are likely to cause pollution are in fact meeting the standards.

It cannot be a once a week or once a month test, but if there is a regular reporting process it is much easier in my opinion.

Senator MUSKIE. Senator Randolph.

Senator RANDOLPH. Mr. Chairman, I would like to welcome Stanley Preiser as a fellow West Virginian to the hearing today. He is recognized generally as an author of books and articles dealing with trial practices and techniques and has held responsible positions of editorship of periodicals in this general field.

I believe, Mr. Preiser, that including last year you were President of the West Virginia Trial Lawyers Association and I believe you held that position for 6 or 7 years; is that correct?

Mr. PREISER. Yes, sir, on two different occasions, 1963 and 1969.

Senator RANDOLPH. I know that some people in West Virginia consider you a controversial lawyer.

Mr. PREISER. There is no question about that. If you try a lot of law suits you have to be.

Senator RANDOLPH. I have always been favorably impressed with your commitment to your client.

Mr. PREISER. Thank you, sir.

Senator RANDOLPH. I am not going to question you, Mr. Preiser, except for one point I would like to expand on and that is in reference to the problem of taking these actions in the State Courts. Would you go into that more thoroughly, sir?

Mr. PREISER. I think the Federal courts are needed because the State judges in many States are required to run in an election contest, with political considerations, even though not consciously, certain subconscious feelings, I think, would affect any judge, no matter how honest he wants to be.

This situation, the effects of political matters, in my opinion, does not exist as much in the Federal Courts as it does in the State Courts. This would have some effect in the trial of these cases in a State Court, so I would much prefer being in front of a Federal judge who might not have the same considerations that a State judge might have to put with.

Senator RANDOLPH. Talking about this airing in which the judge, if not impressed, would have elements pushed in upon him. Apparently that is a direct quote from Jerry Rubin who was convicted in the court which was presided over by Judge Hoffman in Chicago. Following the verdict by the jury in that case, I read on several occasions, and as recently as yesterday, that he addressed an audience in the City College in New York City and said that there was an effort on the part of himself and the others who were being tried to cause "a heart attack" to Judge Hoffman.

Now, as I say, that is apart from this situation. But you, as a lawyer, come into court with the facts and present them, not with an element of emotion. But in matters of this kind the action is strictly upon the basis of the law and the application of the law, is that correct?

Mr. PREISER. Yes, sir.

Senator RANDOLPH. Thank you.

Senator MUSKIE. Thank you very much, Mr. Preiser, for your excellent testimony.

I will ask our next two witnesses to come to the table together. They have separate statements, but I gather it covers the same ground.

Mr. Bernard S. Cohen of Alexandria, Virginia, and Mr. James W. Jeans, Professor of Law at the University of Missouri, Kansas City.

Gentlemen, it is a pleasure to welcome you here this morning. Perhaps you would give us a little autobiographical material?

STATEMENT OF BERNARD S. COHEN, VICE CHAIRMAN FOR FEDERAL LEGISLATION, THE AMERICAN TRIAL LAWYERS ASSOCIATION

Mr. COHEN. Yes. I am Bernard S. Cohen. I am a member of the Bar of the District of Columbia and Virginia. I was formerly President of the Northern Virginia Trial Lawyers Association. I am

presently engaged in several cases involving the environment, one of which is an air pollution case. The major case I have been involved in has become notorious in the Washington area. I have been involved in the suit to prevent and land filing in the Hunting Creek Estuary by developers who wanted to fill in 361½ acres of the Potomac River.

As you may know, this has been the subject of congressional hearings by a Select House Subcommittee.

I am pleased to have the opportunity to appear here today on behalf of the American Trial Lawyers Association and to offer our comments, recommendations and support legislation designed to protect and retrieve a salubrious environment.

The American Trial Lawyers Association is the second largest bar association in this country. It has been in the forefront of the legal effort to protect individuals from personal injury, whether it be on the job, on our highways, airways, railroads or on the high seas. As the organization has pioneered for progress in each of these areas, so it has become concerned with the right of individuals to breathe clean air, drink clean water and eat food uncontaminated by pesticides and herbicides.

I would like to point out to the committee that our members generally represent individuals and therefore are not inhibited by the conflict of interest which arises from the representation of industrial polluters. I think that is a unique point about our Bar Association and that is why we have been able to be in the forefront of fighting for individual rights whether it be from personal injury on the highways or by a contaminated environment.

At its convention in Denver in July of 1969, ATL presented a panel on the environment which was enthusiastically received by more than 1,200 lawyers. The interest was so great that the Board of Governors at that convention created an Environmental Law Committee.

We believe that ATL and its members can help achieve a salubrious environment just as effectively as it helped to achieve progressive workmen's compensation laws, reform in the manufacture and production of dangerous and defective products, and safer automobiles and highways.

The job of preventing environmental despoilation is not the job of any one organization or any one level of government. We do not appear on the scene as knights in white armor. If the job is going to be accomplished it will require interdisciplinary cooperation as well as a national commitment on the level of other space-age goals.

One of the great things that has come out of my association with the effort to save the environment has been my association with scientists; getting them to respect the job that lawyers are trying to do and we have had them help us to a very great extent. We cannot go forward without that interdisciplinary cooperation.

Now, I am telling you about what we as lawyers can do and what scientists can do to help, but we distinctly feel that there is something the government can do.

One of the things we want to point out is that you must give the trial bar the legislative tools which will form the jurisdictional foundation and the procedural building blocks with which to wage the war on pollution. Senate bills 3546, 3229, and 3466 are steps in the right direction. I have some specific comments and recommendations with respect to each of these bills.

Taking Senate bill 3546 first :

Our primary concern is that all persons be protected against polluted air. Ideally speaking, there is no justification for allowing the citizens of Alexandria, Va., to breathe more pollution than the citizens of Jacksonville, Fla., Denver, Colo., Missoula, Mont., or Los Angeles, Calif.

On the other hand, we recognize the undesirability of arriving at a "lowest common denominator" if a national standard is established. We therefore think it is important that the law state that the goal is a zero tolerance for air pollution and that the establishment of regional standards be recognized as an interim step on the way toward achieving the goal. If this is not done, then whatever standards are set will become a license to pollute rather than a regulation for health and safety.

In order to implement the goal, the legislation should state a time limit for the achievement of zero tolerance. Since various respectable scientists predict that we have anywhere from 10 to 30 years to save our environment before we kill ourselves, I suggest that the law set the goal for the achievement of zero tolerance within 5 years so that some margin for error in calculations or achievement is allowed.

As an aside, I wear this little pin here which says "END" which a scientist who I have become familiar with in the fight to save the environment gave me. He said that the word means "Environment Near Death."

I don't come as a prophet of doom and I was very skeptical when I first got into this about all the predictions that we could all be dead within 15 years. However, I think these are sensible men who are giving us this warning and we had better take heed because they know more than we do.

We have recognized that we live in a closed system called "Spaceship Earth" and there are just so many resources. When you divide them by the number of people on the earth and the people who will be on earth by the year 2,000 or sooner, we are just going to run out of our resources, our air and water and minerals. They tell me that we still can do something about it, that there is time to reverse the trend. That is why I am emphasizing so strongly that a time limit be set that this committee and Congress and the people not go away self-satisfied with legislation that is passed thinking that that alone will accomplish it.

We must recognize that this legislation is only the first step and that time is critical.

We therefore suggest that S. 3546 be amended so that beginning on line 21 on page 5 the requirement be that "the Governor of a State shall, from time to time, but at least every 20 months, hold public hearings . . ." This change coupled with a stated goal of zero tolerance within 5 years could enable the States to reach that goal in three steps every 20 months.

We want to emphasize that there is no magic in the period of time that we have suggested; the importance of the suggestion is in its recognition that time is short, the fuse is lighted and we cannot tolerate the luxury of long deliberation, or a law that is open-ended.

Turning now to subsection 13 of S. 3546, beginning at line 22 on page 16, and I will not spend too much time on this because the other gentleman here mentioned it, but we do want to commend the authors of the bill for the recognition of the value of private actions in a

democratic society. It is precisely because of the rugged individualism of the plaintiff's trial bar that we have seen progress in the protection of the rights of the individual from personal injury from whatever quarter the threat of safety may arise. However, we feel that subsection 13 is lacking a very important requirement.

We strongly suggest an addition to subsection 13 allowing the recovery of damages on behalf of individuals or a class. We also want to see it made clear that mere compliance with the standards do not preclude the recovery of damages. It is therefore important to make clear that any adopted standards are minimums.

If you do this, you will see that in addition to the minimum standard which the Act will help achieve, individuals will be able to hasten the goal toward achieving zero tolerance by hitting the polluters in the pocketbook which often seems to be the best way of precipitating corrective action on their part.

Often, the mere availability of private damage actions will cause preventive measures to be taken by an industry.

One of the major problems that federal regulatory agencies have complained about, is the lack of funds and staff to adequately police and regulate the industry involved. One way of making up this deficit without the government having to put up one single penny, is to recognize the existence of the auxiliary regulation which can come from private law suits.

By giving Federal courts jurisdiction and by allowing for the recovery of damages, the agencies charged with doing the regulating, will receive an enormous assist from the trial bar.

As things now stand, the trial bar is frustrated in its attempts to get into State courts because of archaic rulings on jurisdiction and standing and archaic applications of the laws of nuisance, negligence, and trespass. Often, the politics of pollution can only be circumvented in the Federal courts.

There are some State court judges who owe their very existence as judges to one industry in some States.

Now, I just want to emphasize as strongly as I possibly can to this committee that if a client were to come into my office to bring a suit to stop air pollution which has damaged the roofs of their houses and turned their vegetation and indeed even their lungs brown and they tell me they want to recover damages for the injuries that have already been done and I have to tell them that all the laws which the Congress has passed can only help them in the future and we have to go into State court to recover damages and prove all over again what we have just proved in a Federal court, then I think this committee and this Congress should be prepared to hear a roar of cynicism from the people, the likes of which they have never heard before.

I think the bill as it now stands, since it only allows injunctions based upon a set standard, will tend to create the undesirable "lowest common denominator" situation. However, with a law that permits recovery of damages for any injury already suffered, even where the standards have been met, we will have the desired regulatory effect. We strenuously urge the adoption of the suggested change to subsection 13 so that damages may be recovered.

As to Senate Bill 3229:

We are enthusiastically in favor of extending the emission standards to all internal combustion engines.

Those of our members active in workmens compensation practices, are already familiar with the invidious nature of industrial deafness. We applaud the authors of the bill for the recognition of noise as an environmental insult and urge the enactment of regulatory legislation as soon as possible after the Secretary files the report provided for in the bill.

This, again, is an emphasis that we ought not to stop once the Secretary files his report.

Commenting on Senate Bill 3466, we think that the section of the bill dealing with fuels and additives is an important and needed amendment to the Clean Air Act.

With respect to national air quality standards, we have already expressed our concern that any standard (whether set nationally or regionally) should become a "lowest common denominator." The danger of this happening with a national air quality standard appears to be greater than the danger and the results of the same thing occurring with a regional standard.

Again, we want to emphasize that the way to prevent this from occurring is for the law to adopt a zero tolerance as a goal to be achieved within a stated time period. This is imperative whether the regional route or the national route is followed.

If the committee please, I did want to also add to my written statement that there are technical matters to be considered here from the scientific and technical point of view and I don't know whether the committee will be going forward with further hearings.

I noticed that on today's agenda all the participants and speakers seem to be lawyers. In my effort to always make this an interdisciplinary cooperative field, I would strongly urge that the committee to invite some scientists to testify. If the committee wants to have some real insight into the lengths and measures which industry will go to to avoid compliance with even existing standards, I would suggest that this committee subpoena Dr. Clarence C. Gordon of the University of Montana. He has some very interesting things that he could tell you with the benefit of a subpoena. He is probably one of the most knowledgeable people in America today on the technical aspects of air pollution.

If he were here I am sure he would emphasize the fact that such things as sulphur compounds and fluorides accumulate in our system. He always makes this point and therefore, when we talk about standards and we say that if you just don't go over a certain emission this is okay, he just blows this whole theory right out the window because he can show how this theory is pernicious because of the accumulative effect of fluorides and sulphur dioxide compounds. It is similar to what happens with X-rays and other nucleoids.

Again, I hope that the committee will reach out into the scientific community so that it will have the evidence that it will need to support a strong piece of legislation.

Senator MUSKIE. Thank you very much, Mr. Cohen. I think we might proceed with Dr. Jeans' testimony at this point and get both prepared statements before us before we get into questions. At this point I will say that your testimony is excellent. I think you have testified on points of emphasis that need emphasis. We will get back to you.

Dr. JEANS, I wonder if you might, or perhaps Senator Dole would, give some biographical material on you.

Senator DOLE. I learned on the plane that he is a professor of law at the University of Missouri.

**STATEMENT OF PROF. JAMES W. JEANS, UNIVERSITY OF MISSOURI,
KANSAS CITY, MO.**

Dr. JEANS. Thank you. I am professor of law, but lest I be characterized as an academic gelding, I would like to say that I have had some experience in the trial courts and presently am Chairman of the American Trial Lawyers Committee on the Environmental Laws. We have conducted a number of seminars throughout the United States and also, at the present time I am handling environmental suits, so I think I do appreciate some of the practicalities as well as some of the legalities involved in handling these matters.

The solution to the problem of environmental degradation can be simply stated—identify the pollutants as to their source and effect and control their dissipation into the environment. The initial phase, identification, is essentially a matter of mechanics best left to the scientists. The second phase, control, is essentially a matter of motivation—what will move the pollutants to comply?

It is contrary to human experience to believe that conscience alone will dictate good environmental practices. Incentives and sanctions are necessary. The highest order of such incentives or sanctions in a commercially oriented activity must take the form of the carrot or the whip—monetary gain or monetary loss. As to the former, the traditional governmental carrot is tax relief—a method presently adopted by some 17 States. The only whip now provided by Federal legislation is in the heads of an administrative agency and confined to a per diem fine.

The use of the administrative agent as the sole means of invoking sanctions has some obvious shortcomings.

First, historically the performance of governmental regulatory boards has been open to suspicion. Board members are invariably chosen from the industry over which they will serve as policemen (as, indeed, they must be if they are to knowledgable in the field). There is the inevitable community of interest, common educational background, overlapping circles of friends, and continuity of relationships between the policed and policemen—hardly optimum conditions to insure impartial justice.

Second, if these inherent handicaps are overcome and justice is done—there still remains the second essential ingredient of an acceptable policing system, does it appear that justice has been done?

Third, an elaborate administrative agency which assumes the primary obligation of enforcement does not represent the most productive use of federal funds. Other facets of the problem of environmental degradation can be remedied only through the expenditure of federal money. Federal funds spent elsewhere can only impede progress in these fields. The job of enforcement should be undertaken primarily by that branch of government already created and funded and singularly equipped to handle the problem—the courts.

There are numerous reasons for choosing the legal system as the main weapon in the arsenal of enforcement.

First, we have accepted the judicial process as the fairest way of settling disputes. The jury best represents the mood and standards of the community, removes the decisionmaking from the realm of "politics" and gives the appearance that justice has been done.

Second, there is no enforcement agency more diligent, imaginative and tenacious than a trial lawyer in quest of justice—and with a reasonable likelihood of earning a fee.

Why then haven't the courts and the legal system been employed to invoke sanctions against environmental degraders? Primarily because of certain procedural and substantive impediments which can be readily removed. The problems are these:

First, there is a lack of information. A lawyer attempting to secure judicial relief from pollution is confronted with an almost impossible task of proving the source of pollution and its deleterious effects:

Second, in some instances the potential plaintiff has no clearcut authority to establish his standing in court. We have failed to clearly enunciate a right to an unpolluted environment.

Third, a few lawyers will undertake a complicated, lengthy adversary proceeding without a substantial promise of monetary reward.

The remedies for each of the problems are as follows:

As to the first, broaden the provisions of section 1857(d)(j)(1) to require every manufacturer, processor, power producer, et cetera, to monitor the emissions of disposals of all pollutants resulting from their operation; to report such information to the appropriate Federal agency; and to provide that such reports be made available to the public.

Enact a law requiring that the U.S. Weather Bureau obtain information from whatever sources are available (primarily government operated sampling stations) concerning the condition of the ambient air and include such information in the local weather station report.

Amend the provisions of Section 1857b(7) to designate "the basic data" collected by the Secretary admissible in evidence as prima facie proof of the facts and conclusions which it contains.

Enact a law providing that the violation of an emission standard established by the Secretary is prima facie evidence of negligent conduct sufficient to invoke injunctive relief or the awarding of actual damages. Further, that proof that plaintiff's injuries or damages occurred within an air quality control region and resulted in whole or in part from a pollutant or pollutants emitted by the defendant within the same air quality control region shall be prima facie evidence of causal relationship between plaintiff's injuries or damages and defendant's acts.

As to the second, amend section 1857(b)(1) to clearly enunciate the right of each individual to an unpolluted environment.

Enact a law to provide the right of an individual to initiate a complaint to the appropriate State agency and in the event that the conditions giving rise to the complaint are not remedied within 180 days that the complainant may then institute an action in Federal District Court seeking an injunction or other equitable relief which is appropriate.

As to the third, enact a law that when such a suit, as mentioned above is instituted that the Court may assess as costs attorney's fees for the complainant's attorney.

By way of summary let me reiterate that primarily and basically the idea of maintaining environmental integrity is two things: identifying the pollutant, as to source and effect, and controlling it.

The first is obviously a matter for the scientists. They are doing a good job of data collecting. Mr. Cohen and I were invited by HEW to attend the National Air Pollution Control Board in Durham, North Carolina and spend a day with the scientists down there, acquainting them with the problems of translating their findings and studies into court testimony.

It was a very enlightening experience and I know they are far from accomplishing what they would like to accomplish as far as identifying pollutants and determining their deleterious effects.

The second problem of control is a matter of economic pressures. I don't think we ought to take the matter of economics simply from the standpoint of punitive measures. I think it was very encouraging to see that this bill recognizes the fact that economic pressures could be made by way of limiting loans and other governmental help for persons who might be polluting. It should also incorporate the idea of tax incentives for persons who use their money to try to abate nuisances. It is a scheme that has been adopted by a number of States and I think it is advisable that the Federal government also accept that as a means of encouraging compliance.

There is an old theory in the law that "you take the plaintiff as you find him." If you or I were to do a negligent act, like tap a 75-year-old lady in the crosswalk, it would not be much defense for me to say, "If she were 20 years younger it would not have hurt her." So, if a pollutant finds an elderly person suffering from emphysema, and that pollutant is enough to send this person to the grave, I think he is responsible.

Senator DOLE. I agree with the prima facie evidence that that is sufficient in an injunction, but I have a little trouble with the next step with reference to damages. Maybe something can be worked out. It is not in the section now and you are suggesting on Page 3 that we expand this section or expand Section 1857 (b) (7) to make it prima facie both with reference to injunctive relief and also the causal relationship; is that correct?

Dr. JEANS. Yes, that is true. I would also say, incidentally, that aside from these personal nuisance matters, there is a problem of gross abuse of the environment where none of us suffer any particular harm, but society in general is the victim.

I am concerned about the idea of a particular person rushing into court and saying "I am going to stop a polluting operation that is going on." There is a provision which I propose in which a person must file a complaint with the appropriate agency to invoke its help in abating the nuisance. Then if there is not remedial action taken within a length of time, say, 6 months, then he will have sufficient standing in court to proceed as an individual.

Hopefully, the Attorney General will proceed with the abatement once this is brought to his attention, but I believe the public will get a good deal of comfort in knowing that they can proceed as individuals if the occasion demands. I do believe the initial type of complaint to the administrative agency is the best route (such as we have with the Equal Employment Opportunity Act). We give the chance to the

administration to work out something on a basis with the industry but in the case where that fails, then the litigant has a chance in court.

However, you are never going to get, in my judgment, an individual seeking to abate a nuisance unless there is an allocation of attorney fee costs against the persons against whom an equitable relief has been granted. I would say that using, the example of the EEO, attorney costs can be allocated as court costs in the event that a person prevails.

This would be a deterrent to a person cavalierly filing suit. I believe that those provisions, which incidentally do not do a great deal of violence to our legal system, would implement existing law and in many instances spell out things which might very well be developed as the common law develops. But I think in view of the magnitude of the problems it would do a great deal of good to enunciate these principles and incorporate them in the bill.

Senator DOLE. They accuse lawyers of being ambulance chasers. With this they might say: "Where there is smoke, there are lawyers." But I think probably there would not be any great number of suits if we proceed as suggested. I think most lawyers are going to find it difficult, proof is going to be very difficult in any event.

We have had some experience in Kansas on oil pollution and you have polluted streams with salt water and other residue from oil wells and trying to track down the polluter is a great problem. We have tried dyes and everything else in order to trace it to the guilty party. This is the thing that bothers me, when you have, say, out in my area of Western Kansas, or maybe in the case you have, a single source of pollution, but where you have an urban area with all types of things contributing to pollution and maybe the plaintiff's problem will be very difficult.

Dr. JEANS. This is why I believe that the monitoring aspect of this is a key factor.

Senator DOLE. It might protect them, in fact, the monitor.

Dr. JEANS. Yes. At least we can identify the source of the pollution, it would serve to exonerate the innocent person who has been accused of polluting as well as identify those who contribute to the problem.

Senator MUSKIE. I think Dr. Jeans and Mr. Cohen suggested that damage suits be permitted even though standards were adhered to. One question I asked, following Senator Dole's question, dealt with a situation where there are several sources of pollution in an air quality control region. Let's assume that all of them complied with the standards except one. Would any one of the pollutants then be subject to damage suits from a victim suffering from emphysema? Of those in compliance with the standard and the one not in compliance with the standard, which would be subject to the damage suit, one or all?

Dr. JEANS. Again, I have such confidence in the existing law and wisdom of juries, I would say that the business of standards should not be considered any differently than we presently consider violation of statutes. There is non-negligence non-complicance with statutes and reasonable explanations as to why a defendant might travel 50 miles an hour in a 35-mile zone such as rushing an ill child to a hospital. Also, there are instances where a person driving 25 in a 35-mile an hour zone—if it is icy or if they have bald tires—is negligent.

Let me turn to the standpoint of control from the idea of the law. I have been disappointed that most Federal and State legislation for air pollution control, by the wording of the legislation have either ignored the issue of private litigation or have implied that the government is usurping the field and by setting up the administrative controls the legal remedies will be eliminated.

There is an old Roman maxim which expresses the difficulty of administrative controls—"Who will guard the guards themselves?" There is something inherently impossible about such a system of control. It is not confined to industrialists. It is the reason why bar associations, and medical associations do such a poor job of policing their errant members. I would hate to see this business of enforcing the environment left to administrators. If they do overcome the inherent difficulty and do a good job it still falls short of satisfaction. There is a second ingredient to an adequate system of control. It must appear that justice is done. Even if the administrator would do a good job you would always have the talk of "politics" that people have not been involved in the procedure, and so you must turn to the most obvious means of affecting controls, that is that that branch of government, the courts, must handle it.

Let me divide my discussion to the two general groups: the first is the damage area where we have the traditional tort of nuisance, the person who has suffered a harm peculiar to himself. I have great confidence in the plasticity of the common law and its ability to handle this area of environmental degradation.

There is on appeal now in Missouri a claim against a commercial hog raiser. The defendant was accused of causing noxious smells and polluting the plaintiff's creek. The jury returned a verdict of \$140,000 which I think will cause the defendant to think twice before they start throwing their effluent around in the State of Missouri.

There is this business of proof which you gentlemen recognized, through your earlier question, as being a significant legal problem. In this case I mentioned we have a single polluter and an obvious harm. But what happens when we don't have the single polluter and we have a harm which is less obvious than the overwhelming stench from a hog farm?

The first thing we have to do is to get industrial operations to monitor what they are doing. Rather than having sampling systems spread throughout the community it is much more logical to find out from the plant, what has come out of the smoke stack today?

In talking to scientists and people who are attuned to IBM and computer systems, there are a number of censoring devices which can be installed in the stacks themselves which would automatically watch what is happening. So, the monitoring would not be too difficult to be done automatically in many instances and would serve as a constant source of control. In the event that minimal limits were exceeded, there would be your business record that would be admissible as evidence in a legal proceeding.

A lawyer representing a person suffering from a nuisance, can subpoena the records (make them a matter of public record by the way) and have that information translatable into a court of law.

The second thing is the business of getting data concerning the deleterious effects of the pollutant. If we have to go to the various

doctors, the numerous sources and bring them in to testify, the cost is prohibitive. Within the present existing statutes, the Secretary of HHEW can incorporate into their regular reports the data collections. When they collect this data they can designate, the Secretary has the authority to designate certain information as "basic data."

It seems to me once this criterion is established and once the scientists do say that a certain parts per million SO_2 is deleterious to health, this could be "basic data" acceptable as evidence without all the scientists being there. That type of evidence should make a *prima facie* case. Enact a law which would provide that the violation of any of these standards which have been established would be *prima facie* evidence of negligent conduct.

There is a second problem in this business of making a case. In addition to proving liability there must be a showing of causal relationship between the acts of the polluting defendant and the injury to the plaintiff. We have established air control districts which have been identified as entities as far as air pollution goes. It seems to me that if you could show that a pollutant within that center has violated standards and was a source of a pollutant, say, SO_2 , and evidence would be adduced that the plaintiff, living within that same air district suffers from emphysema as a result of SO_2 this should be adequate evidence to establish the causal relationship.

Senator DOLE. Could I interrupt there? How do you isolate other factors that might be responsible for this same illness, emphysema—whether he is a heavy smoker, for example. I recognize that in this section we are all for creating a new field for trial lawyers. I am sure it is not going to be a nonprofit undertaking by the American Trial Lawyers members. I don't want to make it too easy to prove.

You are going to charge a good fee and we have an obligation, of course, to protect the public, but not to at the same time convey to some association and its members an easy way to make a big fee.

Dr. JEANS. No, sir, that is not our purpose. We are merely seeking means by which a plaintiff can readily make a *prima facie* case. After that we still have the wonderful tempering factor of a jury of 12 who will have to pass on the validity of the claim.

Senator DOLE. But you would have to instruct the jury here.

Dr. JEANS. That is right, but the case would go to the jury. I am worrying about getting over the jury rail, about making a *prima facie* case. If this fellow had terminal emphysema by reason of having smoked three packs of cigarettes for 20 years, I don't think the jury would give him damages. If, in fact, that did happen and the jury result was improper the judge could order a remittitur. We have traditional means of appellate review that would afford sufficient protection.

Senator Muskie, I believe you questioned what the effect of a *prima facie* case would be—would it shift the risk of nonpersuasion to the defendant? If it did, we still have the defendant being able to bring in these factors of cigarette smoking, et cetera, and I have enough confidence in the jury system, plus the additional controls on the part of the trial judge and the appellate courts to feel that there would be in the long run a just allocation of costs for the person who has at least contributed to the situation.

So, I don't know what effect compliance with the standards should have. I still believe that non-compliance should shift the risk of non-

persuasion. For those who have lived within the standards, I think they still should be subject to a jury appraisal as to whether or not they have acted reasonably under given circumstances and I don't believe that the risk of non-persuasion should shift to them, but I do believe that they should fall within the general ambit of the rules of law which say that compliance under certain circumstances can be negligent so a person would have to respond in damages.

Senator MUSKIE. I am not so satisfied that you have answered my question.

Senator DOLE. Does Mr. Cohen agree with that?

Senator MUSKIE. Let me make another input. You suggested that if a source of SO_2 exists in an air quality region and an emphysema sufferer lives in that region, that the fact of the coincidence of their existence in the region establishes a prima facie case for purposes of damages. Would that establish it as you conceive of your concept with respect to every source of SO_2 in the region, whether or not that source is in compliance with the standards and next, if a suit is brought against perhaps the source which is most economically viable— independent of whether the source has complied with standards—can that source, if recovery is achieved by the plaintiff, be entitled to move against other sources of SO_2 in the region? How would you unravel this?

Dr. JEANS. I would say so. I would think in an instance like that the plaintiff would probably institute suit against the most viable one economically who in turn would under our existing rules, be able to join as third party defendants other sources of SO_2 in the area. It might very well be, Senator, that again we could utilize other statutory provisions wherein a jury would return a general award of damages and the judge would allocate the responsibility. That is the rule of law we have in the State of Missouri where we have an allocation of funds in a wrongful death situation where you have a parent of a minor child, where there is a gross award of damages and allocation by the judge and that might very well be the situation here, where the jury would determine what sources were the contributing factors to this condition of ill health, arrive at a gross amount of damages that the person has suffered by reason of this and then have the judge allocate who should be responsible for the percentage of responsibility.

Senator MUSKIE. Let me ask one other question, and then Mr. Cohen can respond to any of these points. My question is this: Would the effect of the proposals you have made be to establish in every emphysema sufferer, for example, in an air quality region, cause of action and the right to damages for what has happened before—before the standards were set? Should everybody immediately get a right to damage recovery, every emphysema sufferer or every other respiratory disease sufferer? Does he automatically get a right to damages from what has gone before, independent of any addition to the pollution problems of the community? I ask that because it is emphasizing again the suggestion that the coincidence of residence and the pollution source in the region should establish a prima facie case. You set standards in Washington, and immediately I think you could find emphysema sufferers in this region whose conditions was aggravated by pollution whether or not he could prove there was a causal relation-

ship. Wouldn't your rule of prima facie establish the right to recover for damages?

DR. JEANS. I am not so sure that this would be so in view of the fact that accumulating information as to the source of the pollution in years past would not be easily arrived at. I don't know whether I could prove that if there is some type of pollution in the Washington area what they were doing for the years this man's condition was developing. I don't know if the state of the art in medical science is advanced enough to establish this relationship.

But, if those were true, I think I would have to answer yes, and I think I would have to philosophically justify it on the basis of what Mr. Cohen mentioned. There is no right to pollute and what we are trying to get to is zero tolerance.

SENATOR MUSKIE. Those two points are prospective. I am asking whether the law should be such, if that is the effect of your proposals. We are playing the Devil's Advocate to get the full implication. Should the law be such as to retroactively give all sufferers from respiratory diseases cause of action and a right to answer for what has gone before?

MR. COHEN. I will come right out and say yes. I think it should be that and I will come out and say that without trying to sound very militant or very lacking in understanding for the problems of industry because I do have an understanding of it. But I want to say this: Industry has been playing Russian roulette, only they have not been holding the gun to their heads, but to the public who do suffer from lung disease. They have been holding it to the heads of the public who have heart disorders and to those who are not unhealthy, but are becoming unhealthy as time goes on.

It is not until we accept this understanding of what has gone before, what has been in the past, it is not until we really accept that that we are going to overcome the reluctance to say, yes, Mr. Polluter, you are going to have to pay for what has gone before, for what you have done before and you are especially going to have to pay if you keep it up.

SENATOR MUSKIE. Suppose what has gone before in a given community was the result of a polluter who no longer exists, and now there are new industries in that community which have existed or are recently established. Would you write a law that would make that industry liable for damages for everything that has gone before?

MR. COHEN. This is indicative of the problem and it is not unrelated of the point we are trying to make as to why we are setting a standard of zero tolerance. The mere fact that you are asking these questions is indicative of how difficult it will be if we are willing to live with standards and live with regions, unless we recognize that that decision is fraught with dangers and will only lead us down the road to destruction and will lead us to insolvable problems in laying the blame at anyone's door, we are just not going to correct the problem. You see, when Reynolds Metals meets the standards in Richmond for dumping its fluorides into the James River and it meets that standard and doesn't particularly, supposedly, add to pollution, and then when Kaiser Aluminum comes to Richmond who wants to open its plant and dump its fluorides into the James River, what does the State do then? Does it say to Kaiser, you cannot come into this State even though you will meet the same standards that Reynolds has met all these years because

when we add your pollution the total will exceed anything that is tolerable.

Senator MUSKIE. I don't think what you are saying now is relevant to my question now.

Mr. COHEN. All right, I am poor at making the point then. What I am getting at is this: The mere fact that you are raising those questions is evidence of how difficult it is to live with these standards. I know what you are talking about, this retroactivity.

Senator MUSKIE. You raised the questions. You have made the proposals which suggest the questions. I am not raising them to create problems. I am trying to test your proposals.

Mr. COHEN. With the retroactivity point I see your point and my response is simply this: The polluters are now liable under common laws under the rules of negligence and trespass. I believe anybody who is presently injured has the right to recover.

What I am saying is that recognizing this right to recover we have met with frustrations in that law. If we come to the Senate and recognize that laws should be passed to make it easier, we are not creating new rights, we are merely creating new remedies to enforce the rights which we have been frustrated in enforcing.

Senator MUSKIE. I understand, but I am really not getting at that point. We have been taking testimony for a number of years, undertaking the relationship between air pollution and ill health—not in terms of the disastrous incidence that cause death in terms of long-term low level exposure and we have reached out to get the best evidence that is available to us to establish a relationship, not to support private causes of action, necessarily, but to stir up public support for legislation which has not been around very long.

We have not been successful in getting that kind of evidence. We have gotten educated guesses by doctors and scientists, but there simply is not any record to establish that in the past there has been a connection. You can establish statistically that death rates have risen in a particular area—periods of low inversion and so on—but the long-term low level impact on health, we have not really gotten much other than educated guesses.

As I understand the proposals by Dr. Jeans, the *prima facie* case for damages, he is saying it is not necessary for the plaintiff—or it should not be—to establish that kind of connection; that if he lives where there are one or two emissions, whether or not they exceed a standard, and if an emphysema victim lives in that area, no matter for how short a time, that any source of SO_2 emissions should give him a *prima facie* case for damages.

Dr. JEANS. I am not attempting to circumvent the necessity of proving that a condition is caused by a pollutant, assuming that that proof is there and it has gone beyond the speculative stage, as you have indicated, you are fearful that this is all you have been able to develop so far, educated guesses. If the Secretary of HEW has said that SO_2 in parts per million in the ambient air beyond this level is a definite aggravation to emphysema, then the emphysema victim should be able to come in and make his case.

The fact that it is a straw that broke his back doesn't make the camel feel any better. The fact that there were other pollutants contributing to the condition in the past would not make it in and of itself impossi-

ble to present this as a jury issue. The argument you make would make a very effective defendant's argument before a jury.

Senator MUSKIE. I am not making an argument. I am asking a question. As lawyers, you understand the need to ask questions. I have been exposed to this concept for the last half hour and I am trying to understand what it means. I can only get that understanding by asking questions. I may eventually make an argument based upon this dialogue and others. At the moment, I am trying to get a full understanding of what your proposal is.

Dr. JEANS. That is what it would be. I am assuming the *prima facie* case would still have to have definite medical testimony as to the problem. In the present state of the law now we have to say yes, but did this pollutant cause this man's condition and this is where the scientific knowledge breaks down.

They can give us the statistics, but they all back away when they say this man's condition is because of this fact. What this legal legislation would do is make that proof of pollutant condition a matter of *prima facie* case to a jury to accept or reject as they see fit.

Senator MUSKIE. I think the effect might be this, and this is what I would really like you to respond to: It may be that there is scientific evidence that today would help us to establish a causal relationship. We have not heard it yet.

It has not been offered to us yet. If it does not exist after this law is passed, and if the law is written as you propose, wouldn't the effect of that provision of the law be to establish a right to damages without the establishment of casual relationship?

Dr. JEANS. I would hope to note that I think that would be poor if it were so worded. I would hope that the legislation could be worded that this *prima facie* case would have to come from medical testimony related to the condition.

Senator MUSKIE. Would you agree—and this is a very tentative reaction on my part—that if the condition does eliminate the question, wouldn't any respiratory sufferer have cause for damages upon the enactment of the legislation?

Dr. JEANS. I would say yes. I don't think we can avoid that.

Senator MUSKIE. It may be that that there are public interest justifications for that, but I want to understand what you are saying.

Dr. JEANS. The threat of a flood of litigation in that area is not any worse than the cigarette-cancer situation.

Senator MUSKIE. I am not concerned with the flood, if there is a justifiable basis for the suit.

Mr. Cohen?

Mr. COHEN. There is an old California case involving two hunters who went into the woods, that your committee might want to take a look at. The principle has been adopted by the American Law Institute in the Restatement of Facts. It is called *Summers vs. Tice*. It is 199 P.2d 1. Under this concept where two hunters went into the woods and both fired their shotguns at the same time and injured another hunter, the injured hunter lost his eye and sued both of them and they could not prove whose buckshot took the other's eye out.

The Court would not put up with that nonsense and said, when you put dangerous instrumentalities into the air like buckshot and put it in such a way as not to be careful and you cannot show that

you did not harm this person, we will hold both of you responsible and let you fight it out as to the proper proportion of liability.

There is a lot of good theory in that case which has been adopted. I think some research along those lines can come up with a similar standard to put on multiple polluters and I certainly do recommend that to you.

Another point is this: that when I first started looking at various bills that were introduced to deal with the pollution problems, air or water, I became confused because I started to see some bills like the Hart bill and the bills we are discussing here today and it took me a while to realize that they were really going off on two different points. One was a bill involving standards and other bills were bills involving enforcement or attempts to make private actions available. I would say that the current state of these bills as we have them in their printed form and the ones we are commenting on here today are not really private action bills. There is a section in there that does permit some private action, but basically the private action as the bills now stand are limited to enforcing the standards set out therein.

Now, I have been in touch with a group called the Harvard Law School Environmental Law Society. This group has drafted a bill for the Massachusetts House, called Senate 907. I have one copy of that. I would be happy to make that available to the committee. This bill goes off in the direction of the private action bill and it sets out definitions and standards and quantum of proof and burdens and it possibly could be of some assistance to the committee if the committee wants to either add it to the bills that it now has before it as a very broad private action type of legislation or in the event that it wishes to keep the bill basically as it is, it may wish to consider separately a private action bill.

I do have one copy of S. 907 available. These are very fine law students who worked on this. I don't know whether this bill has passed the Massachusetts legislature, but the bill reflects a lot of work and a lot of thought about a lot of questions you are raising about what it would take to prevail.

Senator MUSKIE. Yes, we would like to have that for the record. If you cannot spare your copy, perhaps we can make a copy of it before you leave.

Thank you very much, gentlemen. I think you opened up some fascinating areas of inquiry. This is one reason we bring in so many lawyers, we think they have a way of building momentum that is sometimes useful in a discussion. Thank you very much.

(The Massachusetts bill, S. 907, follows:)

MASSACHUSETTS LEGISLATURE, 1970 TENTATIVE COMMITTEE REPORT—S.907

SECTION 1. Chapter one hundred and eleven of the General Laws is hereby amended by adding, following Section one hundred and forty-two D, the following section:—

Section 142E: (a) The following terms as used in this section shall, unless the context otherwise requires, have the following meanings:

(1) "Abatement" means any reduction of air pollution up to and including cessation of said emission.

(2) "Air contaminant" means any dust, fumes, mist, liquid, smoke, solid, particulate matter, vapor, gas, odorous substance, or any combination thereof, but shall not include uncombined water vapor.

(3) "Air pollution" means the emission into the atmosphere of one or more air contaminants in such quantities as, from any single source or in combination with other sources, is or tends to be injurious to human health or welfare, animal or plant life, or property, or would unreasonably interfere with the comfortable enjoyment of life or property.

(4) "Located" means residing in or doing business in.

(5) "Person" means any individual, group of individuals, partnership, firm, company, corporation, association, joint stock company, trust, estate, political subdivision, administrative agency, public or quasi public corporation or body, or any other legal entity, or their legal representative, agent, or assigns.

(6) "Prohibitive" means any cost, economic or otherwise, so great as to threaten seriously the continuation of the enterprise. (Copy missing.)

(b) Any person located within an Air Pollution Control District, established pursuant to Chapter One hundred and eleven, Sections 142B through 142D, inclusive, of the General Laws, may, under this section, bring a suit in Superior Court against any other person located within said district. The person bringing suit hereunder need only allege and prove that he and the defendant are located within the district. Proof by plaintiff of air pollution by defendant within said district shall entitle plaintiff to relief as follows:

(1) If plaintiff shall prove that the defendant is or will be causing air pollution and that there is at least one method of abatement, the court shall order abatement to the level attainable, unless the defendant is able to prove by a clear preponderance of the evidence that such abatement would be prohibitive as defined in Subsection a(6) of this section; provided, however, that defendant shall in all cases be required to abate at least to the level of any statutory or regulatory limit on air pollution. The court shall grant defendant the time necessary to institute abatement ordered under this paragraph, but defendant shall be required to post bond in a sum deemed reasonable by the court, conditioned upon defendant's providing proof of compliance to the court on or before the last day of the period allowed him by the court.

(2) Whether or not abatement is ordered under the standards of Subsection b(1), plaintiff may seek an injunction against so much of defendant's enterprise or activity as causes the air pollution. Said injunction will be granted unless defendant shall prove by a clear preponderance of the evidence that the value to the public of said enterprise or activity exceeds the cost of the (copy missing).

(3) If, in addition to seeking equitable relief, plaintiff seeks to recover damages for actual injury, the court shall retain jurisdiction and award damages to plaintiff for that portion of his injuries from air pollution for which defendant's liability is shown, whether or not equitable relief is also available. Proof that a given air contaminant has injured plaintiff and that defendant's enterprise or activity is responsible for the emission, or the production (through emission of an air contaminant and interaction of such contaminant with any other air contaminant or with uncombined water vapor), of a given portion of the sum total of all said air contaminant within the Air Pollution Control District wherein the parties are located shall establish a presumption that defendant is liable for an equivalent portion of plaintiff's injury from said air contaminant. Defendant may limit said presumption by proving, by clear preponderance of the evidence, that he is liable for less than said equivalent portion of plaintiff's injury. Plaintiff may prove, by a clear preponderance of the evidence, that defendant is liable for an additional proportion of plaintiff's injury.

In all cases where the court finds for the plaintiff, recovery for each individual plaintiff shall be in the amount of actual damages or two hundred dollars, whichever is greater; or up to three but not less than two times such amount if the court finds that the air pollution complained of was a willful or knowing violation of any statutory or regulatory limit on air pollution.

(4) If the court finds for the plaintiff, the court shall in addition to other relief provided for by this section and irrespective of the amount in controversy, award the plaintiff said suit.

(c) Proof of compliance with any statutory or regulatory limit on air pollution shall not alone constitute a defense to a suit under this section, except that said compliance shall bar award of damages for willful or knowing violation of any statutory or regulatory limit on air pollution, as provided in subsection 2(c).

(d) (1) Any person entitled to bring a suit under this section may, if the air pollution complained of has caused similar injury to numerous other persons similarly situated and if the court finds in a preliminary hearing that he adequately and fairly represents such other persons, bring a class suit on behalf of

himself and such other similarly injured and situated persons; the court shall require that notice of such suit be given to unnamed plaintiffs in the most effective practicable manner. Such suit shall not be dismissed, settled or compromised without the approval of the court, and notice of any proposed dismissal, settlement or compromise shall be given to all members of the class of plaintiffs in such manner as the court directs.

(2) The court may appoint a master or referee, who shall be a disinterested person and technically qualified, to take testimony and make a report to the court in any suit under this section.

(e)(1) Nothing in this section shall be interpreted in degradation of any existing or future common law or statutory right or remedy against air pollution or any other pollution or damage to the environment.

(2) If any part or parts of this section are declared to be invalid or unconstitutional, those parts not so adjudged shall remain in force.

Senator MUSKIE. Our next two witnesses are Mr. David Sive of New York City and Mr. Edward Lee Rogers of Stony Brook, New York.

I wonder, gentlemen, if each of you would give us some biographical material.

STATEMENT OF DAVID SIVE, ESQ., NEW YORK, N.Y.

Mr. SIVE. The most significant part of my biographical background in this area is having spent a night on the knife edge of Mount Petardin to see the sun rise and I say that seriously because that has brought me into this area.

I am simply an attorney in New York with an essential corporate and general practice. I come into this really by way of being affiliated with a number of national and regional organizations in conservation and a few that come into legal matters which are called the environmental law field.

My comments will be addressed principally to the "citizens' suit" provisions of the bills. I have for a period of years been active in the conduct of litigated matters on behalf of citizens' groups and conservation associations in various environmental matters.

No need exists to document for this Committee the overriding importance of providing for effective enforcement of Federal anti-pollution laws. Laws are only as effective as their enforcement, and serious enforcement problems are inherent in antipollution laws because their enforcement must confer loss or hardship on somebody. The treatment costs or the costs of halting particular activities may be heavy to those who must bear them. The more serious the offense, because of the size or severity of the pollution, the more the residents, merchants, labor unions and public office holders of the area affected may be tempted to disregard breaches of law, because of the adverse economic effect.

These and other factors render private enforcement of the laws critical. By private I mean by civil action at the instance of some person with the necessary standing. Such enforcement may be unpopular and for that reason the private suitor may be exactly the one needed by public officials, elected or appointed, to relieve them of the political liability of enforcement.

Moreover, in pollution matters, as in other environmental or conservation controversies, the interests of large areas of the Nation or of the whole Nation may be adverse to those of the immediate area of the polluting or other resource destroying activity or project. Pollution or

other resource destruction always makes money for some directly and for many others indirectly.

This statement is not the place for any extended discussion of the problems of the private suitor asserting public rights in the environmental field. Much of the history of the conservation movement now broadened to the livable environment movement is involved in the litigation of such problems. As significant a landmark in that movement as any is the first authoritative grant of "standing" to groups of citizens with no strictly economic interest in the resource they sought to protect, that of the natural beauty of Storm King Mountain.

Just five years ago in (*Scenic Hudson*) it was held that:

In order to insure that the Federal Power Commission will adequately protect the public interest in the aesthetic, conservational, and recreational aspects of power development, those who by their activities and conduct have exhibited a special interest in such areas, must be held to be included in the class of "aggrieved" parties under Section 313 (b). We hold that the Federal Power Act gives petitioners a legal right to protect their special interests. (Id. P. 616)

The law has advanced dramatically since the basic standing decision of *Scenic Hudson v. FPC*, 354 F. 2d 608 (2nd Cir. 1965), cert. denied, 384 U.S. 941 (1966); *Nashville I-40 v. Ellington*, 387 F. 2d 179 (6th Cir. 1967), cert. denied, 390 U.S. 921, 19 L Ed. 982 (1968); *Road Review v. Boyd*, 270 F. Supp. 650 (S. D. N.Y.) 1967; *Sierra Club v. Hickel* (Memorandum dated July 23, 1969); Office of Communication and other cases including decisions of the Supreme Court of this month have removed standing as a problem, although the office of the U.S. Attorney General still seems to believe that it should fight against it.

Two other difficult procedural and jurisdictional problems remain, however, in the field of private enforcement of public rights in pollution and other environmental fields: jurisdictional amount and sovereign immunity. The writer is particularly cognizant of these problems because favorable determination of questions based upon them is probably necessary to sustain the district court judgment enjoining the proposed Hudson River Expressway in the cases of *Citizens' Committee v. Volpe*, 301 F. Supp. 1093 presently on appeal before the Court of Appeals for the Second Circuit.

In the Expressway cases, in which it has been held that the construction is illegal because certain structures necessarily involved in it may be built under the Rivers and Harbors Act of 1890, 33 U.S.C. Sec. 401 only with specific Congressional consent, the issue raised and before the Court of Appeals is that of whether the government is immune from suit because it is a sovereign.

It is neither proper nor necessary for me to comment on the legal merits under present law of this and similar claims of sovereign immunity. What is before this committee is the policy question: should there be such immunity? To that question this writer respectfully and emphatically states, "No."

At a time when respect for and obedience of law is perhaps the cardinal issue of all in every field of public office, I respectfully submit that federal or state governments claims that their agencies are immune from, meaning above and beyond the law, be they navigation laws, the pollution laws or any other laws, are as dangerous as they are hypocritical.

Almost equally important is ridding the law of any requirement of jurisdictional amount. If we really do mean what we say in our

anti-pollution laws and policies and in our national dedication to restoring and improving the quality of life, we should not require the enforcement of anti-pollution laws by private litigants to be subject to passing a \$10,000 test of their monetary value. In many cases they will be immeasurable in dollars.

In the Expressway and other cases, arguments are made that in environmental cases, including pollution cases, the amount should be measured by the value of the public right, to the public at large, not of the value of it to one individual. Similar arguments have prevailed with respect to stockholders' derivative suits. *Koster v. Lumberman's Mutual*, 330 U.S. 518 (1947).

Regardless of the legal merit of such arguments, under existing law, I would submit that rights which are immeasurable in dollars should not be unenforceable in the Federal Courts, where they relate to important environmental considerations such as pollution.

Public rights, the very nature of which and the very importance of which places them above and beyond traditional measures of damages, should be enforceable, at least as effectively as those measurable in dollars.

S. 3546, in and by Section 13, is addressed to the standing, the sovereign immunity and the jurisdictional amount problems. I believe that adoption of such legislation, not only in connection with air quality standards, but with water quality standards, and each and every other important environmental code, would be an important contribution to enforcement of the growing body of Federal laws which represent our national policy of restoring and protecting a liveable environment.

Section 13 of S. 3546 provides for action "against any person". This is not limited to governmental agencies. It is addressed to private persons, particularly the offenders. With respect to such persons, it would open the Federal Courts to enforcement of air quality standards independent of any jurisdictional amount requirement and independent of diversity of citizenship.

It is not clear under the present law whether there is any private right of action against polluters, as a matter of substantive law. This problem is one which calls for detailed analysis beyond the time and space available to this writer. In any event, Section 13 of S. 3546 would avoid the necessity of resorting to diversity as a basis of Federal Court jurisdiction if a plaintiff suing under Section 13 had the standing in court.

In my opinion, the only objection to provisions such as those in Section 13 of S. 3546 would be based upon fear of an inundation of suits, brought frivolously or in bad faith. Such fear is, in my opinion, groundless. The proposed Section 13 does not deal with the problem of the general absence and inequality of means of persons suing to enforce environmental rights, as against the corporations and government agencies who, they charge, are infringing those rights.

This is a separate problem which is beyond consideration of the Committee under the present Senate bills. Suffice it to say at this point, from my experience alone, that this committee might be furnished sufficient information to remove any concern whatsoever that provisions such as those of Section 13 of S. 3546 would result in an undue inundation of suits.

I might summarize to perhaps state some thoughts of mine in connection with the point which just arose. Just to have a first go with the substance of what I have in the prepared statement, I think that it is clear that in the whole field of enforcement of public rights and resources, whether it be against pollution or whether it be in the area of preservation of scenic beauty, that up to this point the main burden has been assumed by private persons, primarily private organizations and they are primarily the regional and national conservation groups.

I think if you go through the history of the still small number of cases and important contests you will see that in the forefront have been those national organizations.

Out of that has grown the whole set of problems of enabling them to state in the courts and litigate what I call public rights. I think this is really the foundation of their standing which they have secured them for, that is to litigate public rights.

The history of that is relatively recent and I think all of us know it beginning with the Scenic Hudson case and going through a number of others up to a couple just ten days ago.

With that I think organizations and persons asserting public rights have their standing. The second problem is that of the jurisdiction of the court and here for simplicity and I think just for shortness we should restrict ourselves to the Federal courts.

There the two problems still important are: having a jurisdictional basis, a basis of Federal jurisdiction. Since most of the controversies, and I think this is true and will be true in the pollution field, if a large part of the burden of enforcement is cast upon persons asserting these public rights, in most cases there will be in effect a review in some respects of rulings of administrative agencies. It is not yet clear. It may be clear in cases which I have been involved which are pending now in the Second Circuit that if review laws in the Federal Courts under the Administrative Procedure Act, that that ipso facto establishes jurisdiction. I don't know. If it is not clear then there must be a jurisdictional basis and that may sometimes simply rest upon the jurisdictional amount of \$10,000.

The third problem is that of sovereign immunity and although I think that is a vanishing doctrine and in these days I think it should completely vanish, still in a number of situations, the government authorities, both State and Federal, are raising the problems of sovereign immunity and I think that should be abolished as far as the enforcement of public rights go.

Stating it very simply, if all persons should obey the law and if a governmental agency or somebody receiving a permit from a governmental agency violates the substantive law and then virtually in this day and age when protection of law is perhaps the most important problem we have and coming right from New York at this time I can tell you it is a little personal problem, then it seems to me that we are long past the time when government agencies should have the right to say yes, we may disobey the law, we are, however, immune from it because 300 years ago the king could do no wrong.

Well, the particular provision of 3546 which I have addressed my opinion remarks to and which I might make some contribution to here, that is the citizen suit provision, as I see it, addresses itself to these three problems and I think does it effectively.

That is, it definitely provides the standing which may result in the elimination of any further questions, though in my view as long as we are enforcing public rights now, that is no longer a problem. It will waive the immunity, at least in this field and I would hope that the principal events would extend to fields other than air pollution, indeed all pollution, and other resource fields and would drop the jurisdictional amount requirement.

Now that I think definitely and without any hesitation is necessary, is advisable and should be done in this and in other fields and I have stated that fairly simply and briefly in the written statement.

However, during the course of the discussion this morning, at least that part of it which I heard, has arisen the problem as to what the extent the law should encourage private enforcement of pollution laws for private rights, essentially rights to recover damages.

There I hesitate very much. I think essentially for the same reasons that are implied or expressed in what you have stated and that is the tremendous difficulty of proof.

The sheer complexity of the actions, the complexity of the numbers of plaintiffs, the claims, the sources of pollution the actual legal cause of the injury, and I would have a great deal of concern, one, that if progress which I think is essential and very considerable to our permitting easier enforcement of public rights and those rights are generally enforced in injunctions, in declaratory judgment suits, if the problem in that field is tied to enabling persons to have a very easy time, and I will explain that in a moment, in proving damages, if that is done, then the pollution law field and if this principle extends to other environmental matters, the whole field of the environment, of environmental laws, may become something like the enforcement of automobile negligence.

Now, without taking sides in the controversy that is going on right now in the New York State legislature, in which a whole new system has been proposed to take the enforcement of automobile negligence out of the courts and I might say that that is 60 to 65 percent of the business in the courts, mostly jury trials, at a time when many people are very seriously questioning whether that is the most effective way to affect public policy against automobile negligence.

I would certainly hesitate very much and very carefully before leaping into making damage suits with or without the *prima facie* provision as one of the principal means of enforcement of environmental laws.

Just to state this a bit more pointedly and go back to this point I have made about public rights, the public rights which we have secured and by "we" I mean primarily organizations and groups of individuals, several of which have been represented by the other witnesses here, including Mr. Cohen and Mr. Moorman, those subject **rights are in the nature of rights providing for class actions** and without getting into the intricacies, the standing which was achieved first in the Storm King case is founded upon the private enforcement of a public right by an organization serving a public purpose.

Whether it be likened to a class suit or the derivative suit, the enforcement of a derivative or class right, the suits are enforcing public rights. Their whole origin, both ideologically and legally, is not secur-

ing damages, and is not securing the enforcement of purely private rights.

I think that at this point any legislation which does overcome the principal problems yet remaining, the jurisdiction and the immunity in the enforcement of those public rights should not be tried as a wholly new provision which would vest much of the enforcement of environmental laws in private damage action with or without the *prima facie* proof.

I would respectfully suggest that the consideration of encouraging private damage actions be perhaps delayed some and that that be analyzed very carefully before that is tied to any legislation such as S. 3546 which makes this considerable progress in the enforcement of public rights.

I think that because most of the testimony of the other witnesses who have preceded me has really gone into most of these matters that I would at this point hold the statement and ask Mr. Rogers to give his statement and then if there are any questions, I will be glad to answer them.

Senator MUSKIE. I would like to ask just one at this point. One very persuasive argument for damage suits is the question of cost as to bringing suits.

How would you respond to that? Do we need to put in a provision for damage suits in order to make the concept for class suits viable?

Mr. SIVE. If that is meant to provide monies to pay the lawyers to bring the suits, that is a problem and perhaps the main problem in private enforcement of environmental rights, including pollution laws. I can say from direct personal experience that most of the court cases in which some progress has been made have been made at the cost of great sacrifice by the attorneys, the witnesses, and everybody else associated.

I don't know, however, whether simply providing damages rather than encouraging damage actions with or without this *prima facie* provision will be going too far toward making enforcement of these public rights another large portion of the business of lawyers.

I am a lawyer and as much as anybody else I seek business to pay the rent and my secretary. My present thought is this: I think as a matter of common law if there are breaches of the pollution laws the present damage suits law, I think the idea is not so much the damage suit as to get the injunction. But I refer to a suit which is in the New York State Court of Appeals. I would say at this time, without having the opportunity to really study it further, which I will be glad to do if that would provide assistance to the committee or the staff, that we should go very easily toward opening up or encouraging large numbers of damage suits.

I have a very strong feeling that that might not be the way to secure enforcement of laws which really concern vital public policies and perhaps without doing injury to the profession which I belong, to the extent that the laws are enforced with damage suits, that means that one way or the other, the cost is increased by 20 to 40 percent of the cost of enforcement, that being the cost of the suit, including the very fair compensation of the attorneys.

So, I am not certain at this point that one of the main problems is securing the hundreds of millions and much more needed for enforce-

ment of pollution laws that this committee should go fairly quickly into any provision which adds appreciably to that cost of enforcement, whether or not it be the fees and expenses of my own profession.

Senator MUSKIE. Thank you very much.

Mr. Rogers?

**STATEMENT OF EDWARD LEE ROGERS, GENERAL COUNSEL,
ENVIRONMENTAL DEFENSE FUND, INC.**

Mr. ROGERS. Mr. Chairman and Members of the Committee. My name is Edward Lee Rogers. I am general counsel of the Environmental Defense Fund, a non-profit corporation dedicated to the protection of environmental quality. I wish to thank the subcommittee for inviting me to testify before it on the air pollution bills under consideration.

EDF is a coalition of scientists and other interested citizens designed to present environmental issues to the administrative agencies and to courts of law.

To give you some personal biographical information, before coming with EDF I was an attorney for the Department of Justice for a number of years. During that time I litigated a conservation suit on my own and lost. I am now handling two cases for the Fund myself, other cases being handled for the Fund by retained attorneys, including Mr. Moorman who testified here this morning.

EDF seeks injunctive and declaratory judgment relief. We are concerned about the vindication of public rights. Our experience has convinced us of the necessity of adequate statutory provisions and their strict enforcement for the protection of the environment. For example, we are now prosecuting the case against DDT in the Court of Appeals for the District of Columbia. We seek an order requiring the Secretary of Health, Education, and Welfare to establish a zero or minimal tolerance for DDT on raw agricultural products, and an order requiring the Secretary of Agriculture to suspend the registration of DDT as an approved economic poison.

Federal statutes protecting the public from carcinogenic agents in their food, and from insecticides which when used according to directions are nonetheless injurious to man or vertebrate animals, are an important part of our case. I refer to the Food, Drug and Cosmetic Act, 52 Stat. 1040, as amended, 21 U.S.C. Sec. 301, et seq., and the Federal Insecticide, Fungicide, and Rodenticide Act, 64 Stat. 163, as amended, 7 U.S.C. Secs. 135-135b.

Just as the statutes upon which we rely in the DDT cases gave us (as we interpreted them) standing to petition the Secretaries of HEW and Agriculture, a most desirable feature of S. 3546 is to add paragraph 13 to Section 108(c) of the Clean Air Act, as amended.

Under that provision any person will be able to maintain a civil action to seek equitable relief or declaratory judgment against any person or government agency for alleged violations of the applicable air quality standards, plans for implementation, and emission requirements.

Our experience in DDT cases, as well as our experience in our case against the United States Corps of Engineers, in which we seek to enjoin construction of the Cross-Florida Barge Canal, has convinced

us that we cannot expect adequate environmental protection to be solely the responsibility of Federal agencies.

The problem is not solely the existence of Federal agencies which have been single-mission oriented, or dominated by one industry or another. Even the most dedicated and conscientious public servants in State and Federal agencies concerned, for example, with air pollution, cannot do the enforcement job by themselves. I know from personal experience of the frustrations of a most dedicated and able public health officer in Missoula, Montana, where we are prosecuting an air pollution case.

That officer knows that if governmental abatement procedures to protect the public from possibly dangerously polluted air are to be initiated, he must first carry out an extensive monitoring and data compilation program. Until recently, however, he has not had sufficient funds with which to obtain the equipment and trained personnel necessary for such a program.

Clearly, such agencies, at the city, county, State and Federal level, should receive much more support than many of them are receiving now. But even when such funding is forthcoming, it is essential that a pluralistic attack on our environmental problems be carried on by all segments of our society.

I would like to add here that there has been some talk of the present expense of litigating on behalf of the public interest. Those costs should be held to reasonable minimums. We have been able to retain two hundred people on our scientists advisory committee.

These people testify without fee. We are attempting to see that principle preserved. We do pay their expenses, but we think it is important that if there is to be a grass roots effort for a cleaner environment that we maintain this tradition of no fees for expert witnesses so far as that is possible.

Because of that, community groups composed of housewives, students, and other citizens can be effective combat units in the fight against pollution. Graduate students in various disciplines can help to ferret out and research the necessary facts. Women often have the time to do the necessary organizing and fund raising. Even in cases where we have not actually acted as plaintiff, we have given aid and acted as the scientific institution for them.

Such groups can sometimes retain publicly-minded attorneys to represent their groups at less cost than one might think. Such groups can thus effectively augment government efforts to combat pollution if given adequate access to the courts.

The last sentence of paragraph 13 is also important. It provides that paragraph 13 is not to "affect the rights of such persons as a class or as individuals under any other law to seek enforcement of such standards." I make one suggestion in connection with that statement. I would delete the period after "standards" and add "or to seek enforcement of any other remedies that they would otherwise have under other laws" or words to that effect.

I suggest this because in our Missoula, Montana, air pollution suit, the corporation defendant has argued that the Federal District Court has no jurisdiction of the subject matter of the suit because the Clean Air Act has either federally preempted the area of air pollution abate-

ment or, at least, that primary jurisdiction is in the Federal agencies charged with enforcement of air quality standards.

In that case, we were not relying on violation of ambient air quality standards because none had been promulgated for some of the pollutants in question. Under such circumstances, citizens should not be limited to seeking enforcement of the Federal standards if they can prove that harmful emissions not covered by the standards are occurring. It was not the purpose of paragraph 13 to suggest any such limitation. But if there is doubt on this point I think paragraph 13 should be clarified.

I might add that the kind of testimony we are relying on in the Montana case is scientific testimony about the damage caused by the sulphur compounds. It was through the efforts of Dr. Clarence Gordon that we got that evidence. He was mentioned here earlier.

Now, there has been some talk about a flood of litigation. I am speaking now only about injunctive relief and declaratory judgments and leaving aside the question of damage suits.

Certainly, as to the question of abatement suits, there need be no apprehension that the courts will be flooded with air pollution cases brought by individuals or organizations like ours. The sacrifice in time on the part of volunteers to raise funds and do the necessary research, and the limited funds available, is sufficient to deter any contemplated action except in the most flagrant of air pollution cases.

There has been some question of costs. I think the important thing is the allowance of costs. It was mentioned that costs should be granted only to the prevailing party. I think that is possibly a justifiable position, but I think that perhaps it is preferable that the prevailing party should have costs at the discretion of the court and perhaps in certain instances the court should grant costs to a losing party. Let's assume that the court is convinced that even though the plaintiff in an air pollution case attempting to vindicate the public right to a decent environment has shown a real problem in the community and has shown that abatement can be made, but has not won abatement at that time; he may be technically a losing party, but the court may feel that he should receive costs. What is winning and losing, in these cases, it seems to me, is sometimes difficult to determine.

I point out that Section 108(c) (13) of the Clean Air Act, if enacted, would help to carry out and give meaning to the statement in Section 101(c) of the National Environmental Policy Act, Public Law 91-190, 83 Stat. 853, that "each person has a responsibility to contribute to the preservation and enhancement of the environment . . ." I urge that it be enacted.

I should also like to comment briefly on several other aspects of the bills pending before this Committee. Section 4(d) of S. 3546 would amend Section 108(c) of the Clean Air Act, as amended, to provide in paragraph (7) for the abatement of violations of emission requirements within 72 hours.

This is a step in the right direction. Insofar as I have been able to determine the general tenor of enforcement in too many instances has been the endless granting of waivers and exceptions.

Clearly, considering the care and public hearings provided for setting emission requirements, there is no basis for any further procrastination about enforcing them once they are put into effect. Seventy-two hours may be too long a period. It is certainly not too short.

Certainly public hearings for all of these procedures should be retained in the law. Certainly citizens should have a voice in the quality of their air. I strongly urge that public hearing provisions be retained and if possible the processes be expedited but not at the cost of eliminating public hearings.

Under S. 3466, there would be a new Section 112 of the Clean Air Act providing standards for stationery sources of emission. I am concerned about subsection (b) which seems to extraordinarily liberal towards polluters. Perhaps that was not the intention, but that is the way I read it. Note for example that subsection (b) (1) provides that the applicable regulations shall prohibit new sources of emissions only if they are "extremely hazardous to health."

It doesn't use the word "only", but that seems to be the inference.

Further, even under those circumstances, the Secretary may make a specific exemption "with respect to such construction or operation." Similarly, existing sources of emission control only have to meet the "extremely hazardous" test.

I find that language disturbing; "extremely hazardous to health" is a low common denominator. We want to get over something like that.

Finally, it is provided that all new sources of emissions other than those extremely hazardous to health, apparently need to be controlled only "to the fullest extent compatible with the available technology as determined by the Secretary."

There appears in these provisions little to induce an upgrading of the state of available technology.

I bring this up because of the recent New York Court of Appeals case involving the cement factory. There the Court remanded the case for determination of permanent damages and enjoined the plaintiffs from bringing any further actions against this cement factory. The court discussed the state of the art and said they could not foresee any improvement in the state of the art in the future. I think that is a step in the wrong direction. I think the courts and legislatures have to provide inducements to industry to see that there will be improvements in the state of the technology and such inducement have to be written into the law.

We can do it. We improved technology to the point of getting a man to the moon, several men now. We have to take the same attitude here. This is a crisis situation.

I would like to go on to one other point and I realize this probably cannot be handled by this legislation at this time, but I want to bring it up. I note that automobiles that are definitely intended to be exported are excluded from the requirement of the National Emissions Control Act. I recognize the competitive reasons for doing this now. I suggest we are going to have to have international cooperation in the areas of pollution control and perhaps there would be some manner of not accepting cars being imported into this country unless those manufacturers satisfied our control requirement for cars they export into other countries.

What I am suggesting is that some sort of international negotiations lead to controls for automobiles throughout the world.

That concludes my prepared statement.

Senator MUSKIE. Thank you very much, Mr. Rogers. May I ask—you, and perhaps Mr. Cohen, raised the subject first—what your con-

ception of the meaning of zero tolerance would be? I think Mr. Cohen suggested using that as the legislative goal, having it written into the bill.

What do you have in mind as the concept for zero tolerance? Maybe Mr. Cohen would like to comment also. It has a nice ring to it and it certainly expresses what we want to achieve, but now we have to be concerned with what it means in terms of pollutants. Does this mean an absolute abolition of stacks, for example? Must every industry build a closed system, completely closed so that there are no emissions of any kind into the atmosphere? Is that what is meant by zero tolerance, or does it have something to do with the concept of zero effects of pollutants on health?

There are two different definitions of the idea. I wonder if you would like to discuss the meaning of zero tolerance as you conceive it.

MR. ROGERS. As was mentioned this morning, there is a necessity of not relying solely on the air standards, but looking at the source and trying to control the source. I would view at least one aspect of the zero tolerance concept as dealing with that aspect of the source problem.

Senator MUSKIE. Does that mean to you the same as zero emissions?

MR. ROGERS. No, obviously not. You are going to have emissions. The question is: How much can you do to clean them up, to make them inoffensive and non-toxic?

Senator MUSKIE. That is the point which troubles me.

MR. ROGERS. In other words, perhaps for each industry, you know the members of each industry compete with each other and if they are all on a timetable set by legislation to clean up their emissions, just leaving aside the other question, if they are all in the same timetable to clean up and if they can be exempted from anti-trust provisions in order to cooperate on that part of the technology, they might be able to accomplish zero pollutant levels.

Senator MUSKIE. You have used two concepts: zero emissions and harmful pollutants. Zero emissions is one thing and zero emissions of harmful pollution is another because that suggests that there is a threshold for effects. If there is a threshold—pollutants can be emitted up to a certain threshold without any harmful effects—we have not found anyone who is ready to take the responsibility for establishing it.

There is just not that kind of evidence available from the present state of research in order to establish the lowest requirement.

MR. ROGERS. Since that is the situation—we know that HO_2 and SO_2 are harmful pollutants—and since we don't know what a safe threshold is, it seems to me in order to protect the public interest there should be a requirement for eliminating the emissions of those harmful pollutants in the air.

Maybe we cannot achieve it completely, but we can keep aiming in that direction.

Senator MUSKIE. Mr. Cohen said a five-year goal, or at least a fixed time goal. If you talk about the goal in terms of zero emissions, you are talking perhaps about a longer period of time than if you talk about zero tolerance in the sense of a threshold, a level below which you are reasonably satisfied there are no health effects.

Mr. COHEN. Senator, might I express my view that I do take a rigid position that zero tolerance will mean zero emissions; that we do have available to us under the present state of the art the ability to zero out certain kinds of harmful contaminants in emissions to air and where that state of the art is available we ought to tell industry to use that.

Where it is not available we ought to say, okay, we recognize that it is not available now, but we want you to know that when the scientists tell us that it is available we will give you a certain amount of time to adopt it.

That is the position I take. I recognize it is a costly position. It is costly only if you measure it in terms of what it costs to put it in to take out the pollutant. It is less costly when measured in terms of the detriment to our gross national product. The detriment that comes from death and ill health.

Senator MUSKIE. Do you mean that we ought to outlaw the internal combustion engine within a certain period of time?

Mr. COHEN. I think under the present technology that we have, that is where we are going to have to go unless some scientist or technician can come up and say that we can modify the internal combustion engine as it exists.

Again, I am out of my field of competence, so I think it is important to talk to the scientists, too.

We have to let them tell us what is achievable or what can be done.

Senator MUSKIE. I understand, but I don't know of any testimony we have had to the effect that when you burn something you can technologically eliminate any emissions from the combustion process.

Mr. COHEN. I agree. I think the goal has to be elimination of the internal combustion engine.

Senator MUSKIE. How about incinerators?

Mr. COHEN. I think the goal will have to be elimination of incinerators.

Senator MUSKIE. How about home heating furnaces?

Mr. COHEN. I think we are certainly capable of having much more efficient home heating furnaces than we have now.

Senator MUSKIE. But that is different from zero emissions.

Mr. COHEN. Oh, yes. I recognize that not everything is capable of achieving zero emissions, but if our goal is always to look, and ask, is it possible to achieve a zero emission in this case and we call the scientists and technicians in and they say, yes, this is what it will take, then we should say, go to it, boys. This is what you have to do.

Senator MUSKIE. But you have put in a qualification on your original statement. You said there that we must have zero tolerance.

Mr. SIVE. Isn't there a question here of absolutes? Isn't everything we smoke or eat or heat our houses with somewhat harmful? I have been having difficulty between the cigarette smoke from the gentleman next to me in the airplane to anything that comes out of the factory.

I have trouble with that black and white difference.

Senator MUSKIE. I agree with you wholeheartedly that there are no absolutes. This air pollution is a product of combustion. You can and should work to make combustion more efficient. Some things you should not be permitted to burn at all because of their effect. But in terms of zero emissions, whatever combustion there is, I think that is going farther than is possible.

I have said that the figures in gross national product to a great extent are a product of the combustion that is going on.

Our job, it seems to me, is to press to make combustion more efficient, to press for the cleaning up of fuels which, as a result of combustion, discharge undesirable pollutants into the atmosphere, to try to capture in stacks other harmful emissions, but all of these objectives are something different than zero emissions.

I think there may be a way of defining zero tolerance that fits what you have in mind, Mr. Cohen, but I think this is the first time we have had the phrase introduced in the testimony. I was attracted to it when Mr. Cohen first used it, but I thought I had better ask some questions to make sure I knew what you had in mind.

Mr. SIVE. Personally, I think it is a good phrase in the political field, but the very vagueness of it is something which may not be capable of definition in the statute. I hasten to say black or white or zero or 10-percent to anything, knowing how many things which we live with which are in one sense or another harmful.

Senator MUSKIE. You know how we politicians are attracted to colorful labels.

Mr. SIVE. Yes, I know, that is why I say this is a fine political phrase, but not one which is adaptable to a statute.

Senator MUSKIE. You think there must be a "truth-in-packaging" for us, too?

Dr. JEANS. The amount of tolerance we can have in the body for DDT and some scientists have said that when we know that a particular type of chemical is deleterious to health we will not be content by saying you have "X" amount of it within your body and they have as far as some of these very noxious situations, said we cannot tolerate it. So to throw in my definition of the zero tolerance, I would relate it to the noxious pollutants rather than all types of emissions.

Senator MUSKIE. That is most relevant in terms of the effect on an individual's limit of a particular pollutant. I think it does have meaning.

You heard me earlier this morning refer to the McGovern-Hart bill, S. 3575. That legislation, as I read it, emphasizes the approach of pollution suits to abatement of pollution rather than the basis that S. 3546 provides: The violation of emission standards or plans for implementation.

Do you gentlemen have an opinion on these two approaches?

Mr. ROGERS. I think Mr. Preiser stated it earlier. What he said is quite appropriate. He said that the provision for providing the right to sue to abate unreasonable pollution is not inconsistent with the concept of standards because the standards tend to be the most common denominator of tolerance for pollutants.

I agree with that approach and I would also add that it is often difficult for these agencies to set up standards for every possible pollutant.

Senator MUSKIE. There would be some time before they are all covered.

Mr. ROGERS. That is right. There may be some day when we will have a very complete Federal package that would set up adequate standards that we would be happy with, but I think it is very good

to have a flexible approach to allow for this, but these we have now are not adequate or complete.

So, I tend to favor the approach of that bill and I tend to think it is consistent with the establishment of standards such as is set out in 3546.

Senator MUSKIE. All right. Thank you, gentlemen, very much. If any of you would like to comment further in supplementary statements as a result of points which have been raised, we would be delighted to receive your comments and would include them in the record.

(The following was subsequently received from Mr. Rogers:)

ENVIRONMENTAL DEFENSE FUND, INC.,
Stony Brook, N.Y., April 1, 1970.

Hon. EDMUND S. MUSKIE,

Chairman, Subcommittee on Air and Water Pollution, Committee on Public Works, U.S. Senate, Washington, D.C.

MY DEAR SENATOR: During the hearings on the air pollution bills on March 23, 1970, you expressed interest in receiving a copy of the opinion of the New York Court of Appeals in *Boomer v. Atlantic Cement Co.* A copy of the initial draft of the opinion as it was distributed to the parties is enclosed.

In my testimony on March 23, I did not discuss the suggestion made by several other witnesses that Section 108(c)(13) of the Clean Air Act, as proposed in S. 3546 provide for damage suits as well as suits for declaratory and equitable relief. I think the suggestion needs modification.

The primary concern of the statute is the abatement of pollution and Section 108(c)(13) should be designed to help attain that objective. As the *Boomer* opinion indicates, however, and as the dissenting opinion points out, the allowance of damages—especially permanent damages—without also requiring abatement of the polluting activity tends to assure the perpetuation, instead of the abatement, of pollution. If Section 108(c)(13) conferred jurisdiction "of civil actions * * * for declaratory and equitable relief or damages or any other appropriate order against any person" (words emphasized added), the federal district courts would be free to do what the appellate court did in *Boomer*. To the extent the courts avoid ordering abatement by awarding damages instead, the purpose of the statute will be frustrated.

In short, therefore, statutory relief in the form of damages should not be given the same dignity or priority as "declaratory or equitable relief." Instead, if damages are to be allowed at all (and it may be equitable and desirable to allow them), at most a sentence should be added before the present last sentence of Paragraph (13) to provide that: "if a court determines and grants declaratory and equitable relief, it may in addition grant money damages for loss or harm resulted from the violation."

Under such a limited provision, a court would still be compelled to make the decision that is important to the public interest—namely, that abatement should or should not be compelled.

To turn to another aspect of Paragraph (13), it now provides that persons may sue on behalf of themselves or on behalf of "any other persons similarly situated" within an air quality control region. I suggest that the words "any" before "other persons" and "similarly" before "situated" be deleted. The class actions which the statute intends to authorize will often be brought only through the effort and help of plaintiff organizations on behalf of persons within such a region. Such organizations themselves, however, may not be located within the region. That is, such organizations may not have formal chapters or organizational ties within the region involved although they are working closely with local concerned community groups and individuals. The change I suggest will make it clear that such organizations qualify as plaintiffs under the statute.

Thank you for the opportunity to submit this supplemental statement.

Respectfully submitted,

EDWARD LEE ROGERS,
General Counsel.

STATE OF NEW YORK COURT OF APPEALS

(No. 242)

OSCAR H. BOOMER AND JUNE C. BOOMER, APPELLANTS

v.

THE ATLANTIC CEMENT COMPANY, INC., RESPONDENT

(And five other actions)

(No. 475)

CHARLES J. MEILAK & ANO., APPELLANTS

v.

THE ATLANTIC CEMENT COMPANY, INC., RESPONDENT

OPINION

BERGAN, J.:

Defendant operates a large cement plant near Albany. These are actions for injunction and damages by neighboring land owners alleging injury to property from dirt, smoke and vibration emanating from the plant. A nuisance has been found after trial, temporary damages have been allowed; but an injunction has been denied.

The public concern with air pollution arising from many sources in industry and in transportation is currently accorded ever wider recognition accompanied by a growing sense of responsibility in State and Federal Governments to control it. Cement plants are obvious sources of air pollution in the neighborhoods where they operate.

But there is now before the court private litigation in which individual property owners have sought specific relief from a single plant operation. The threshold question raised by the division of view on this appeal is whether the court should resolve the litigation between the parties now before it as equitably as seems possible; or whether, seeking promotion of the general public welfare, it should channel private litigation into broad public objectives.

A court performs its essential function when it decides the rights of parties before it. Its decision of private controversies may sometimes greatly affect public issues. Large questions of law are often resolved by the manner in which private litigation is decided. But this is normally an incident to the court's main function to settle controversy. It is a rare exercise of judicial power to use a decision in private litigation as a purposeful mechanism to achieve direct public objectives greatly beyond the rights and interest before the court.

Effective control of air pollution is a problem presently far from solution even with the full public and financial powers of government. In large measure adequate technical procedures are yet to be developed and some that appear possible may be economically impracticables.

It seems apparent that the amelioration of air pollution will depend on technical research in great depth; on a carefully balanced consideration of the economic impact of close regulation; and of the actual effect on public health. It is likely to require massive public expenditure and to demand more than any local community can accomplish and to depend on regional and interstate controls.

A court should not try to do this on its own as a by-product of private litigation and it seems manifest that the judicial establishment is neither equipped in the limited nature of any judgment it can pronounce nor prepared to lay down and implement an effective policy for the elimination of air pollution. This is an area beyond the circumference of one private lawsuit. It is a direct responsibility for government and should not thus be undertaken as an incident to solving a dispute between property owners and a single cement plant—one of many—in the Hudson River valley.

The cement making operations of defendant have been found by the court at Special Term to have damaged the nearby properties of plaintiffs in these two actions. That court, as it has been noted, accordingly found defendant

maintained a nuisance and this has been affirmed at the Appellate Division. The total damage to plaintiffs' properties is, however, relatively small in comparison with the value of defendant's operation and with the consequences of the injunction which plaintiffs seek.

The ground for the denial of injunction, notwithstanding the finding both that there is a nuisance and that plaintiffs have been damaged substantially, is the large disparity in economic consequences of the nuisance and of the injunction. This theory cannot, however, be sustained without overruling a doctrine which has been consistently reaffirmed in several leading cases in this court and which has never been disavowed here, namely that where a nuisance has been found and where there has been any substantial damage shown by the party complaining an injunction will be granted.

The rule in New York has been that such a nuisance will be enjoined although marked disparity be shown in economic consequence between the effect of the injunction and the effect of the nuisance.

The problem of disparity in economic consequence was sharply in focus in *Whalen v. Union Bag & Paper Co.* (208 N.Y. 1). A pulp mill entailing an investment of more than a million dollars polluted a stream in which plaintiff, who owned a farm, was "a lower riparian owner". The economic loss to plaintiff from this pollution was small. This court, reversing the Appellate Division, reinstated the injunction granted by the Special Term against the argument of the mill owner that in view of "the slight advantage to plaintiff and the great loss that will be inflicted on the defendant" an injunction should not be granted (p. 2). "Such a balancing of injuries cannot be justified by the circumstances of this case", Judge Werner noted (p. 4). He continued: "Although the damage to the plaintiff may be slight as compared with the defendant's expense of abating the condition, that is not a good reason for refusing an injunction" (p. 5).

Thus the unconditional injunction granted at Special Term was reinstated. The rule laid down in that case, then, is that whenever the damage resulting from a nuisance is found not "unsubstantial", viz., \$100 a year, injunction would follow. This states a rule that had been followed in this court with marked consistency (*McCarty v. Natural Carbonic Gas Co.*, 189 N.Y. 40; *Strobel v. Kerr Salt Co.*, 164 N.Y. 303; *Campbell v. Seaman*, 63 N.Y. 568).

There are cases where injunction has been denied. *McCann v. Chasm Power Co.* (211 N.Y. 301) is one of them. There, however, the damage shown by plaintiffs was not only unsubstantial, it was nonexistent. Plaintiffs owned a rocky bank of the stream in which defendant had raised the level of the water. This had no economic or other adverse consequence to plaintiffs, and thus injunctive relief was denied. Similar is the basis for denial of injunction in *Forstmann v. Joray Holding Co.* (244 N.Y. 22) where no benefit to plaintiffs could be seen from the injunction sought (p. 32). Thus if, within *Whalen v. Union Bag & Paper Co.* (*supra*) which authoritatively states the rule in New York, the damage to plaintiffs in these present cases from defendant's cement plant is "not unsubstantial", an injunction should follow.

Although the court at Special Term and the Appellate Division held that injunction should be denied, it was found that plaintiffs had been damaged in various specific amounts up to the time of the trial and damages to the respective plaintiffs was awarded for those amounts. The effect of this was, injunction having been denied, plaintiffs could maintain successive actions at law for damages thereafter as further damage was incurred.

The court at Special Term also found the amount of permanent damage attributable to each plaintiff, for the guidance of the parties in the event both sides stipulated to the payment and acceptance of such permanent damage as a settlement of all the controversies among the parties. The total of permanent damages to all plaintiffs thus found was \$185,000. This basis of adjustment has not resulted in any stipulation by the parties.

This result at Special Term and at the Appellate Division is a departure from a rule that has become settled; but to follow the rule literally in these cases would be to close down the plant at once. This court is fully agreed to avoid that immediately drastic remedy; the difference in view is how best to avoid it.*

*Respondent's investment in the plant is in excess of \$45,000,000. There are over 300 people employed there.

One alternative is to grant the injunction but postpone its effect to a specified future date to give opportunity for technical advances to permit defendant to eliminate the nuisance; another is to grant the injunction conditioned on the payment of permanent damages to plaintiffs which would compensate them for the total economic loss to their property present and future caused by defendant's operations. For reasons which will be developed the court chooses the latter alternative.

If the injunction were to be granted unless within a short period—e.g., 18 months—the nuisance be abated by improved methods, there would be no assurance that any significant technical improvement would occur.

The parties could settle this private litigation at any time if defendant paid enough money and the imminent threat of closing the plant would build up the pressure on defendant. If there were no improved techniques found, there would inevitably be applications to the court at Special Term for extensions of time to perform on showing of good faith efforts to find such techniques.

Moreover, techniques to eliminate dust and other annoying byproducts of cement making are unlikely to be developed by any research the defendant can undertake within any short period, but will depend on the total resources of the cement industry nation-wide and throughout the world. The problem is universal wherever cement is made.

For obvious reasons the rate of the research is beyond control of defendant. If at the end of 18 months the whole industry has not found a technical solution a court would be hard put to close down this one cement plant if due regard be given to equitable principles.

On the other hand, to grant the injunction unless defendant pays plaintiffs such permanent damages as may be fixed by the court seems to do justice between the contending parties. All of the attributions of economic loss to the properties on which plaintiffs' complaints are based will have been redressed.

The nuisance complained of by these plaintiffs may have other public or private consequences, but these particular parties are the only ones who have sought remedies and the judgment proposed will fully redress them. The limitation of relief granted is a limitation only within the four corners of these actions and does not foreclose public health or another public agencies from seeking proper relief in a proper court.

It seems reasonable to think that the risk of being required to pay permanent damages to injured property owners by cement plant owners would itself be a reasonably effective spur to research for improved techniques to minimize nuisance.

The power of the court to condition on equitable grounds the continuance of an injunction on the payment of permanent damages seems undoubted. (See, e.g., the alternatives considered in *McCarty v. Natural Carbonic Gas Co.*, *supra*, as well as *Strobel v. Kerr Salt Co.*, *supra*.)

The damage base here suggested is consistent with the general rule in those nuisance cases where damages are allowed. "Where a nuisance is of such a permanent and unabatable character that a single recovery can be had, including the whole damage past and future resulting therefrom, there can be but one recovery" (66 C. J. S., Nuisances, § 140, p. 947). It has been said that permanent damages are allowed where the loss recoverable would obviously be small as compared with the cost of removal of the nuisance (*Kentucky-Ohio Gas Co. v. Bowling*, 95 S. W. 2d 1.5).

The present cases and the remedy here proposed are in a number of other respects rather similar to *Northern Indiana Public Service Co. v. W. J. & M. S. Vesey* (200 N. E. 620) decided by the Supreme Court of Indiana. The gases, odors, ammonia and smoke from the Northern Indiana company's gas plant damaged the nearly Vesey greenhouse operation. An injunction and damages were sought, but an injunction was denied and the relief granted was limited to permanent damages "present, past, and future" (p. 634).

Denial of injunction was grounded on a public interest in the operation of the gas plant and on the court's conclusion "that less injury would be occasioned by requiring the appellant [Public Service] to pay the appellee [Vesey] all damages suffered by it * * * than by enjoining the operation of the gas plant, and that the maintenance and operation of the gas plant should not be enjoined" (p. 625).

The Indiana Supreme Court opinion continued: "When the trial court refused injunctive relief to the appellee upon the ground of public interest in the continuance of the gas plant, it properly retained jurisdiction of the case and

awarded full compensation to the appellee. This is upon the general equitable principle that equity will give full relief in one action and prevent a multiplicity of suits" (p. 627).

It was held that in this type of continuing and recurrent nuisance permanent damages were appropriate. See, also, *City of Amarillo v. Ware* (120 Tex. 456, 40 S. W. 2d 57, 61) where recurring overflows from a system of storm sewers were treated as the kind of nuisance for which permanent depreciation of value of affected property would be recoverable.

There is some parallel to the conditioning of an injunction on the payment of permanent damages in the noted "elevated railway cases" (*Pappenhelm v. Metropolitan El. Ry. Co.*, 128 N. Y. 436, and others which followed.) Decisions in these cases were based on the finding that the railways created a nuisance as to adjacent property owners, but in lieu of enjoining their operation, the court allowed permanent damages.

Judge Finch, reviewing these cases in *Ferguson v. Village of Hamburg* (272 N. Y. 234, 239-240), said: "The courts decided that the plaintiffs had a valuable right which was being impaired, but did not grant an absolute injunction or require the railway companies to resort to separate condemnation proceedings. Instead they held that a court of equity could ascertain the damages and grant an injunction which was not to be effective unless the defendant failed to pay the amount fixed as damages for the past and permanent injury inflicted." (See, also, *Lynch v. Metropolitan El. Ry. Co.*, 120 N. Y. 274; *Van Allen v. New York El. Ry. Co.*, 144 N. Y. 174; *Cox v. City of New York*, 265 N. Y. 411, and similarly, *Westphal v. City of New York*, 177 N. Y. 140.)

Thus it seems fair to both sides to grant permanent damages to plaintiffs which will terminate this private litigation. The theory of damage is the "servitude on land" of plaintiffs imposed by defendant's nuisance. (See *United States v. Causby*, 328 U. S. 256, 261, 262, 267, where the term "servitude" addressed to the land was used by Justice Douglas relating to the effect of airplane noise on property near an airport.)

The judgment, by allowance of permanent damages imposing a servitude on land, which is the basis of the actions, would preclude future recovery by plaintiffs or their grantees (see *Northern Indiana Public Service Co. v. W. J. & M. S. Vesey supra*, p. 623).

This should be placed beyond debate by a provision of the judgment that the payment by defendant and the acceptance by plaintiffs of permanent damages found by the court shall be in compensation for a servitude on the land.

Although the Special Term has found permanent damages as a possible basis of settlement of the litigation, on remission the court should be entirely free to re-examine this subject. It may again find the permanent damage already found; or make new findings.

The orders should be reversed, without costs, and the cases remitted to Special Term to grant an injunction which shall be vacated upon payment by defendant of such amounts of permanent damage to the respective plaintiffs as shall for this purpose be determined by the court.

JASEN, J. (dissenting) :

I agree with the majority that a reversal is required here, but I do not subscribe to the newly enunciated doctrine of assessment of permanent damages, in lieu of an injunction, where substantial property rights have been impaired by the creation of a nuisance.

It has long been the rule in this state, as the majority acknowledges, that a nuisance which results in substantial continuing damage to neighbors must be enjoined. (*Whalen v. Union Bag & Paper Co.*, 208 N. Y. 1; *Campbell v. Seaman*, 63 N. Y. 568; see, also, *Kennedy v. Moog*, 21 N. Y. 2d 966.) To now change the rule to permit the cement company to continue polluting the air indefinitely upon the payment of permanent damages is, in my opinion, compounding the magnitude of a very serious problem in our state and nation today.

In recognition of this problem, the legislature of this state has enacted the Air Pollution Control Act (Public Health Law, §§ 1264-1299-m) declaring that it is the state policy to require the use of all available and reasonable methods to prevent and control air pollution (Public Health Law, § 1263¹).

¹ See also, Air Quality Act of 1967, 81 Stat. 485 (1967).

The harmful nature and widespread occurrence of air pollution have been extensively documented. Congressional hearings have revealed that air pollution causes substantial property damage, as well as being a contributing factor to a rising incidence of lung cancer, emphysema, bronchitis and asthma.²

The specific problem faced here is known as particulate contamination because of the fine dust particles emanating from defendant's cement plant. The particular type of nuisance is not new, having appeared in many cases for at least the past sixty years. (See, *Hulbert v. Calif. Portland Cement Co.*, 161 Cal. 239 [1911].) It is interesting to note that cement production has recently been identified as a significant source of particulate contamination in the Hudson Valley.³ This type of pollution, wherein very small particles escape and stay in the atmosphere, has been denominated as the type of air pollution which produces the greatest hazard to human health.⁴ We have thus a nuisance which not only is damaging to the plaintiffs,⁵ but also is decidedly harmful to the general public.

I see grave dangers in overruling our long established rule of granting an injunction where a nuisance results in substantial continuing damage. In permitting the injunction to become inoperative upon the payment of permanent damages, the majority is, in effect, licensing a continuing wrong. It is the same as saying to the cement company, you may continue to do harm to your neighbors so long as you pay a fee for it. Furthermore, once such permanent damages are assessed and paid, the incentive to alleviate the wrong would be eliminated, thereby continuing air pollution of an area without abatement.

It is true that some courts have sanctioned the remedy here proposed by the majority in a number of cases,⁶ but none of the authorities relied upon by the majority are analogous to the situation before us. In those cases, the courts, in denying an injunction and awarding money damages, grounded their decision on a showing that the use to which the property was intended to be put was primarily for the public benefit. Here, on the other hand, it is clearly established that the cement company is creating a continuing air pollution nuisance primarily for its own private interest with no public benefit.

This kind of inverse condemnation (*Ferguson v. Village of Hamburg*, 272 N.Y. 234) may not be invoked by a private person or corporation for private gain or advantage. Inverse condemnation should only be permitted when the public is primarily served in the taking or impairment of property. (*Matter of New York City Housing Auth. v. Muller*, 270 N.Y. 333, 343; *The Pocantico Water Works Co. v. Bird*, 130 N.Y. 249, 258). The promotion of the interests of the polluting cement company has, in my opinion, no public use or benefit.

Nor is it constitutionally permissible to impose servitude on land, without consent of the owner, by payment of permanent damages where the continuing impairment of the land is for a private use. (See, *Fifth Ave. Coach Lines v. City of New York*, 11 N.Y. 2d 342, 347; *Walker v. Hutchinson City*, 352 U.S. 112.) This is made clear by the State Constitution, Article I, section 7(a), which provides that "[p]rivate property shall not be taken for public use without just compensation" (emphasis added). It is, of course, significant that the section makes no mention of taking for a private use.

In sum, then, by constitutional mandate as well as by judicial pronouncement, the permanent impairment of private property for private purposes is not authorized in the absence of clearly demonstrated public benefit and use.

I would enjoin the defendant cement company from continuing the discharge of dust particles upon its neighbors' properties unless, within eighteen months, the cement company abated this nuisance.⁷

² See U.S. Cong., Senate Comm. on Public Works, Special Subcomm. on Air and Water Pollution, *Air Pollution 1966*, 89th Cong., 2d Sess., 1966, at 22-24; U.S. Cong., Senate Comm. on Public Works, Special Subcomm. on Air and Water Pollution, *Air Pollution 1968*, 90th Cong., 2d Sess., 1968, at 850, 1084.

³ New York State Bureau of Air Pollution Control Services, *Air Pollution Capital District*, 1968, at 8.

⁴ J. Ludwig, "Air Pollution Control Technology: Research and Development on New and Improved Systems", 33 *Law and Contemporary Problems*, 217, 219 (1968).

⁵ There are seven plaintiffs here who have been substantially damaged by the maintenance of this nuisance. The Trial Court found their total permanent damages to equal \$185,000.

⁶ See, *United States v. Causby* (328 U.S. 256); *Kentucky-Ohio Gas Co. v. Bowling*, (95 S.W. 2d 1, 5); *Northern Indiana Public Service Co. v. Vesey* (200 N.E. 620); *City of Amarillo v. Ware* (120 Tex. 456, 40 S.W. 2d 57, 61); *Pappenheim v. Metropolitan El. Ry. Co.* (128 N.Y. 436); *Ferguson v. Village of Hamburg* (272 N.Y. 234).

⁷ The issuance of an injunction to become effective in the future is not an entirely new concept. For instance, in *Schwarzenbach v. Onconta Light and Power Co.* (207 N.Y. 671), an injunction against the maintenance of a dam spilling water on plaintiff's property was issued to become effective one year hence.

It is not my intention to cause the removal of the cement plant from the Albany area, but to recognize the urgency of the problem stemming from this stationary source of air pollution, and to allow the company a specified period of time to develop a means to alleviate this nuisance.

I am aware that the Trial Court found that the most modern dust control devices available have been installed in defendant's plant, but, I submit, this does not mean that *better* and more effective dust control devices could not be developed within the time to abate the pollution.

Moreover, I believe it is incumbent upon the defendant to develop such devices, since the cement company, at the time the plant commenced production (1962), was well aware of the plaintiffs' presence in the area, as well as the probable consequences of its contemplated operation. Yet, they still chose to build and operate the plant at this site.

In a day when there is a growing concern for clean air, highly developed industry should not expect acquiescence by the courts, but should, instead, plan its operations to eliminate contamination of our air and damage to its neighbors.

Accordingly, the orders of the Appellate Division, insofar as they denied the injunction, should be reversed, and the actions remitted to Special Term to grant an injunction to take effect eighteen months hence, unless the nuisance is abated by improved techniques prior to said date.

IN EACH ACTION:

Order reversed, without costs, and the case remitted to Supreme Court, Albany County, for further proceedings in accordance with the opinion herein. Opinion by Bergan, J. All concur except Jasen, J., who dissents in part and votes to reverse in an opinion. Breitel and Gibson, JJ., taking no part.

Senator MUSKIE. Before we adjourn I want to suggest to the witness who appeared here today that we will welcome additional materials from them or the organizations they represent. If they are received in time they will be included in the printed record of the day the witness appeared. Otherwise, we will attempt to provide an appendix to the entire hearings for their inclusion.

(Subsequently the following was received:)

MANUFACTURING CHEMISTS ASSOCIATION,
Washington, D.C., June 12, 1970.

HON. EDMUND S. MUSKIE,
Chairman, Subcommittee on Air and Water Pollution, Committee on Public Works, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: Supplementary to our testimony of March 20, 1970, the Manufacturing Chemists Association (MCA) wishes to express its continuing interest in S. 3546 and to suggest language whereby the purposes of certain of its provisions (and those of H.R. 17255) may be expressed.

The Manufacturing Chemists Association is a nonprofit trade association of 172 United States company members representing more than 90% of the production capacity of basic industrial chemicals within this country.

Our comments are directed particularly to two provisions of these bills. One, the requirement for the use of "best available pollution control techniques" by new sources, and two, the provisions for federal emissions standards for certain classes of fixed sources.

Whereas we share with your Committee concern that new plants, in the design of their air pollution control facilities, anticipate future needs for environmental protection as industrial and population growth make more stringent control necessary, we do not feel that it is appropriate for the Secretary to define "best available technology" by federal regulation and to enforce its use in all new plants by arbitrary fiat.

S. 3546 treats this matter in two different subsections. Subsection 4(a) proposes that Paragraph 1 of Section 108(c) of the Clean Air Act be amended to provide (in subparagraph (1) (E)) that "such plan includes a procedure to assure

that proposed new sources of emissions will not cause violation of such standards. . . ." This language is repeated in clause (2) (C) (v).

Subsection 4(c) proposes to add to Section 108 of the Clean Air Act, as amended, a new subsection (i) directing the Secretary to issue regulations to require the use of "the latest available pollution control techniques" in any new building, structure, or facility, and to issue certificates of compliance with this requirement.

We believe that both administrative convenience and technological progress can best be served by combining these provisions, placing the permit system in the hands of the state authorities and making the adequacy of the state plan in respect thereto a condition for approval of that plan by the Secretary.

To that end, we suggest that the language in Subparagraph (1) (E) and clause (2) (C) (v) be amended to read: "such plan includes a procedure to assure that proposed new sources of emissions will not cause violations of such standards and that, in their design and construction, they make reasonable and prudent provisions to anticipate future requirements for the protection of ambient air quality standards."

We hold that such language will encourage the installation of the best control devices technologically and economically feasible and that, in most cases, this level of control will be installed. The suggested language expresses directly the concept that we feel to be basic to the problem, and provides a flexibility of approach that may include anticipation of future technology but not necessarily require the installation of control facilities beyond reasonably predictable needs.

We further hold such language as appears on page 17, line 19, of S. 3546, "the latest available pollution control techniques" to be particularly inappropriate as there is no assurance that the latest techniques are necessarily superior to those with a longer history of successful application, either in the general case or with respect to any specific instance.

There are, however, certain areas in which the federal government may properly play a more direct role in setting emission standards for stationary sources. We believe that the number of such instances would be small, and that the federal agency should have authority to tailor its requirements on a case-by-case basis. Two classes of such sources for which federal emissions restrictions may be appropriate are: (1) sources of such magnitude that their emissions would have significant impact upon the air quality in regions beyond the jurisdictional limits of their state air pollution control agency, and (2) sources of emissions of such toxicity that abatement through presently provided mechanisms could still lead to threat of serious or irreversible health effects upon those exposed during the interim.

In the absence of one or both of these justifications, there would appear to be little valid cause to burden the federal machinery with a permit system. When these justifications exist, direct federal controls may provide both a more effective and more efficient route to the protection of the public health.

We propose that the requisite authority be provided the Secretary by amending S. 3546 by replacing subsection (i) (page 17, line 14 through page 18, line 2) with the following:

"(i) For the purpose of preventing the occurrence of significant new air pollution problems arising from or associated with a class or classes of new stationary sources which, because of the nature and amount of emissions therefrom, may contribute substantially to endangerment of the public health, the Secretary shall from time to time by regulation, giving appropriate consideration to technological and economic feasibility, designate such class or classes, and establish standards with respect to such emissions. Such emission standards may be established only after reasonable notice and opportunity for interested parties to present their views at a public hearing. Any regulations hereunder, and amendments thereof, shall become effective on a date specified therein, which date shall be determined by the Secretary after consideration of the period reasonably necessary for compliance. The Secretary may exempt any industry or establishment, or any class thereof, from this section, upon such terms and conditions as he may find necessary to protect the public health, for the purpose of research, investigations, studies, demonstrations, or training, or for reasons of national security.

"Such standards shall provide that—

"(1) If the Secretary finds that the resultant emissions from the operation of any such class or classes of emission sources will be extremely hazardous to public health, all new sources of such emissions shall be constructed and operated only in conformity with such emission requirements

as the Secretary from time to time issues as being necessary and appropriate to protect the health of persons.

"(2) If the Secretary finds that emissions from a proposed new source of a designated class reasonably may be anticipated to degrade significantly the ambient air quality in geographic areas beyond the limits of the air quality control region or state in which such new source is proposed to be constructed, the construction and operation of a new source of such emissions shall be subject to such conditions and restrictions as the Secretary deems necessary for the protection of the public health.

"(3) Notwithstanding any other provisions of this Section, the Secretary, upon receipt of evidence that a pollution source subject to the provisions of this subsection is violating the conditions and restrictions he has established therefor, may request the Attorney General to bring suit on behalf of the United States in the appropriate United States District Court to immediately enjoin such violation."

We believe that the language we have offered will provide the federal government with means for the effective and expeditious abatement of those sources for which state controls may be of marginal adequacy for the full protection of the public health. At the same time, these provisions will retain to the states the responsibilities and authorities essential for efficient and effective state abatement programs and avoid bogging down the federal establishment with the administrative details of permit systems for sources of only local significance.

We hope that these views can be considered by your Subcommittee during its current executive sessions on S. 3546, and express our appreciation for this opportunity to present them to you.

Sincerely,

W. J. DRIVER.

Senator MUSKIE. We will recess until 9:30 tomorrow morning.

(Whereupon, at 12:25 p.m., the subcommittee recessed, to reconvene in joint session with the Subcommittee on Energy, Natural Resources, and the Environment, of the Senate Committee on Commerce, at 9:30 a.m., Tuesday, March 24, 1970.)

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